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THE

FARMERS' INSTRUCTER;

CONSISTING OF

ESSAYS, PRACTICAL DIRECTIONS, AND HINTS

FOR THE MANAGEMENT OF

THE FARM AND THE GARDEN.

ORIGINALLY PUBLISHED IN THE CULTIVATOR; SELECTED AND REVISED FOR THE SCHOOL DISTRICT LIBRARY.

BY J. BUEL, ESQ.

"I know of no pursuit in which more real and important services can be rendered to any country, than by improving its agriculture."
Washington.

IN TWO VOLUMES.

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THE

FARMER'S INSTRUCTER.

INTRODUCTION.

Address delivered before the New-York State Agricultural Society, by J. Buel, President of the Society.

We have associated, gentlemen, to increase the pleasures and profits of rural labour; to enlarge the sphere of useful knowledge; and, by concentrating our energies, to give to them greater effect in advancing the public good. In no country does the agricultural bear so great a proportion to the whole population as in this. In England, one third of the inhabitants only are employed in husbandry; in France, two thirds; in Italy, a little more than three fourths;* while in the United States the agricultural portion probably exceeds five sixths. And in no country does the agricultural population exercise such a controlling political power, contribute so much to the wealth, or tend so strongly to give an impress to the character of a nation, as in the United States. Hence it may be truly said of us, that our agriculture is our nursing mother, which nurtures, and gives growth, and wealth, and character to our country. It may be regarded as the great wheel which moves all the machinery of society, and that whatever gives to this a new impulse or energy, communicates a corresponding impetus to the thousand minor wheels of interest which it

* Babbage on the Economy of Machinery.

propels and regulates. Knowing no party, and confined to no sect, its benefits and its blessings, like dews from Heaven, fall upon all. Identified, then, as agriculture is, with the interests of every department in society, it becomes *our* profession, in particular, to endeavour to enlighten its labours, to remedy its defects, and to accelerate its improvement.

Of the multitude of objects which present themselves as worthy of our consideration, I can only embrace a few of the most prominent ones in the subject matter of this address. I shall particularly invite your attention to

The economy and application of manures;

The improvement of farm implements and machines;

The advantages of draining;

The present mode of managing our hop and barley crops;

The division of labour;

The introduction of new articles of culture; and

To some illustration of the comparative profits of good and bad husbandry.

Manures.—If we consider that all animal and vegetable substances are susceptible of being converted into manure, or food for farm-crops, and reflect upon the great quantity of these which are wasted upon a farm; and if we add to these considerations the fact, now well established by chymical experiment, that yard dung loses a large portion of its fertilizing properties in the gases which escape, where fermentation is suffered to exhaust its powers upon it in a mass, we may be able to appreciate, in some measure, the great defects which exist in our general management of this all-important material. Manures are a principal source of fertility. They are to our crops what hay and forage are to our cattle; the food which is to nourish and perfect their growth. Continual cropping,

without manure, as certainly exhausts land of its fertility, as constant draining from a cistern that is never replenished exhausts the water which it contains. The practice of some, who, disregarding one of the soundest rules of farming, continue to crop without manuring until the soil will no longer yield a return to pay for the labour, is upon a par with that of the man who undertook to teach his horse to live without food; just as the experiment was about to succeed, the horse died. A considerable portion of the lands in Virginia and Maryland, which were originally fertile, have in this way been injudiciously exhausted, and thrown into commons as not worth enclosing. I lately received a letter from a young gentleman in the former state, soliciting my advice as to the means best adapted to restore fertility to two worn-out farms, which had recently come into his possession, and which, he stated, would no longer produce clover. It is much easier to prevent sterility than to cure it, on the same principle that it is easier to *keep* a cow in flesh when she is so than to *restore* her to flesh after she has become wretchedly lean. In some soils, to which nature has been uncommonly bountiful in imparting the means of fertility, as in many of our river alluvions, the deterioration is slow and imperceptible; yet it nevertheless goes on even there. But in ordinary, and particularly in the lighter soils, the profits of husbandry depend, in an eminent degree, upon the faithful application of all the manure which a farm can be made to produce.

In regard to the question, In what condition are manures most economically applied? I am sensible that a difference of opinion exists, many contending, even on philosophical grounds, that it is most wise to apply them after they have undergone fermentation. If the question was merely whether a load of fermented or unfermented dung is of the greatest intrinsic value, in ordinary cases the for-

mer would be entitled to the preference, because it contains the greatest quantity of vegetable food. But the correct way to state the question would be this: Will *five* loads of rotted manure impart greater fertility than *ten* loads that are unrotted? The numbers ought rather to be five and fifteen; for I think common dung suffers a diminution of two thirds, instead of one half, in volume, by a thorough process of rotting.* It will assist in determining the question, if we ascertain what the manure parts with during fermentation, for it evidently loses much in weight as well as in bulk, and whether this lost matter would, if buried in the soil, have afforded food to the crop. For if it possessed no fertilizing property, the sooner it is got rid of the better, and we save the expense of transporting it to the field. But if it really consists of prepared or digested food, fitted for the organs and wants of plants, it is truly improvident to have it wasted and lost for all useful purposes. The latter is really the case.† The matter which escapes in fermentation is vegetable matter in a gaseous form, fitted by natural process, like chyle in the animal stomach, to enter into and become a constituent in a new generation of plants. It is principally carbonic acid gas, the aliment of

* During the violent fermentation which is necessary for reducing farmyard manure to the state in which it is called *short muck*, not only a large quantity of fluid, but of gaseous matter, is lost, so much so that the dung is reduced one half or two thirds in weight, and the principal elastic matter disengaged is carbonic acid, with some ammonia; and both these, if retained by the moisture in the soil, as has been stated before, are capable of becoming a useful nourishment for plants.—*Davy.*

† As soon as dung begins to decompose or rot, it throws off its volatile parts, which are the most valuable and most efficient. Dung which has fermented so as to become a mere soft cohesive mass, has generally lost from one third to one half of its most useful constituent elements. It evidently should be applied as soon as fermentation begins, that it may exert its full action upon the plant, and lose none of its nutritive powers.—*Ibid.*

vegetables and the true staff of vegetable life. It has been vegetable matter, and will become vegetable matter again. Without resorting to chymical proofs or authorities to prove this, I will suggest a mode by which the matter can be satisfactorily settled. Let any farmer, in the spring, before yard manure ferments, put twenty-five loads in a pile to rot, and take another twenty-five loads to the field where he intends to plant his corn, spread it upon one acre, plough it well under, harrow the ground, and plant his seed. Let him plant another acre of corn along side of this, *without manure*. As soon as the corn is harvested, carry on and spread the twenty-five loads of prepared or rotted manure left in the yard, or what remains of it, upon the acre not manured for corn, and sow both pieces to wheat. Unless my observation and practice have deceived me, he will find the result of the experiment to be this: the acre dressed with long manure will yield the most wheat, because the manure has been less exhausted in the process of summer rotting, and for the reason that, in cultivating the corn, it has become better incorporated with the soil; *and it will, besides, have increased the corn crop some twenty or thirty bushels, in consequence of the gases upon which the crop here fed and thrived*, but which in the yard would be dissipated by the winds and lost.

Plants, like animals, require different modifications of food. In general, the plants which afford large stocks or roots, as corn, potatoes, turnips, and clover, thrive best on the gases which are given off from dung in the process of fermentation; while those exclusively cultivated for their seeds, as wheat, barley, &c., are often prejudiced by these volatile parts, which cause a rank growth of straw, without improving the seed. Hence the first-mentioned crops may be fed on long manure without lessening its value for the second class, provided they immediately follow, and hence unfermented

manures are most economically applied to hoed crops.

Different rules should govern in the application of fermented and unfermented manures. The latter should be buried at the bottom of the furrow with the plough, the former only superficially with the harrow. The reasons are these: unfermented dung operates mechanically while undergoing fermentation, in rendering the recumbent soil porous and pervious to heat and air, the great agents of decomposition and nutrition, and the gaseous or volatile parts being specifically lighter than atmospheric air, *ascend*,* and supply the wants of the young roots. The next ploughing turns the residue of the dung to the surface, when it benefits on a different principle; for fermented manures consist of ponderable substances, which have a tendency only to *descend*.

Manures possess a high value in good farming districts, where the natural fertility of the soil has been impaired by culture. In most of our large towns it is bought up at one to two dollars a cord, and transported ten or twenty miles by land-carriage, and much farther by water. So essential is it considered in Europe to profitable husbandry, that every material which imparts fertility is sedulously economized and applied to the soil. Among other things, shiploads of bones are annually brought from the Continent into Great Britain, and ground for manure. Bonedust is in such high de-

* A friend made this experiment: He trenched a quarter of his garden, and deposited a layer of dry straw, three inches thick, one foot below the surface, as the only manure, and planted it with watermelons. The crop, he said, was the finest he ever grew. On examining the straw in autumn he found it was completely rotted and reduced to the condition of short muck. He was satisfied that his melons had been highly bene fited by the straw while undergoing fermentation, and that, had the straw rotted in the yard, the volatile portions of the ma nure would have been wholly lost.

mand in Scotch husbandry, that its price has advanced to 3*s.* 6*d.* sterling, equal to seventy-five cents, per bushel.

We possess no certain data to ascertain the saving which may be introduced into this branch of farm economy; yet if we put down the number of farms in the state at one tenth of our population, or 200,000, and estimate that an average increase of five loads upon each farm might annually be made, it will give us a total of one million loads, which, at the very moderate price of twenty-five cents, would amount to $250,000 per annum.

Farm Implements.—We must all have noticed the great improvements which a few years have made in the mechanic and manufacturing arts. Scarcely a process is managed as it was twenty years ago. Scarcely an old machine but has undergone improvements or given place to a better model. Manufacturing operations have been simplified and abridged, and human labour has been reduced to a comparative cipher, by the substitution of machinery and the power of steam. The effect has been a great reduction in the price of manufactured commodities, and an increase in their consumption. We are assured, that during the twelve years which elapsed between 1818 and 1830, Sheffield wares—hardware and cutlery—experienced an average reduction in price of sixty per cent., varying upon different articles from forty to eighty-five per cent.* Cotton goods, books, and various other fabrics, have undergone a reduction no less remarkable within our time. These beneficial changes have resulted, in a great measure, from the aid which science has either imparted, or which it has elicited from mechanic skill; for a useful invention often awakens latent genius, and calls forth successful competition, even in the unlearned. No

* Babbage on the Economy of Machinery.

sooner is an improvement in the manufacturing arts announced, than it is adopted whenever it can be rendered beneficial—such is the facility of intercourse—such the desire, the necessity—*there*, of profiting from every discovery which benefits their art. The farmer is less able and less willing to keep pace with the march of intellect. He has few opportunities of becoming acquainted with the improvements of others, except by slow degrees; and he is so liable to be taken in by the catchpenny productions of the day, and is, withal, so distrustful of new experiments, that he will hardly venture to buy new implements and machines, nor to adopt new practices, however beneficial they might prove on trial. Mr. Coke tells us that his examples in farming (and few men ever gave better) only enlarged the circle of their influence about a mile in a year. Hence, as regards this branch of improvement, we have much to do ere we can overtake the spirit of the age, as exemplified in our sister arts.

Many of our farm implements have undergone improvement; yet there are others which have been either but partially introduced, or are hardly known, that are calculated to abridge labour and to increase the profits of the farm. There exists a great disparity in the quality of implements. In ploughs, for instance, there is a difference which eludes superficial observation, particularly in regard to the force required to propel them, that is worth regarding. I have seen this difference, in what have been termed good ploughs, amount to nearly fifty per cent., or one half. The perfection of our implements is intimately connected with a correct application of mechanical science, a branch of knowledge hitherto too little cultivated among us. Mr. Many, the enterprising proprietor of an iron foundry in this city, has assured me that there are more than two hundred patterns of ploughs now in

use in this state. Of this number some may be very good, but many must be comparatively bad. But what individual is able to decide upon their relative merits, or even to become acquainted with the different sorts? It would be rendering an important service to the state at large, and especially to the farming interests, if a competent board were appointed, comprising men of practical and scientific knowledge, to test thoroughly, by examination and perfectly satisfactory trials, not only the ploughs, but the other implements of husbandry now in use, or which may be hereafter invented, and to publish the result of their examination, and certify their intrinsic and relative merits. Such board might meet once or twice in a year, and no inventor or vender who had confidence in the goodness of his machine would fail to repair to the place of trial. This would tend to call into action mechanical science and skill, in the confidence of receiving a just reward; the public would confide in the trial and opinions of the board; good implements would be extensively introduced, and bad ones would be discarded. The expense of the examination would bear no proportion to the public benefit.

Draining:—Few expenditures in husbandry are calculated to make better returns than those made in draining, a branch of labour which has had a very limited practice among us, and of which we have yet much to learn. Many of our best lands are permitted to remain in a comparatively unproductive state, on account of the water which saturates the surface or reposes on the subsoil. To render these lands productive, even for arable purposes, it is only necessary, by well-conducted and sufficient drains, to collect and carry off the surplus water which falls upon the surface or rises from springs below. The rationale of draining is briefly this: Air and heat are essential agents in preparing the food of plants which is deposited in the soil, and they

are also necessary to the healthful development of most of the cultivated varieties. These agents are, in a measure, excluded from the soil by the water. The temperature of a soil, habitually saturated with spring water from beneath the surface, seldom exceeds 55 to 60 degrees at midsummer. Hence the grain and grasses, which require a heat of 80 or 90 degrees to bring them to a high state of excellence, can never thrive in these cold situations, where they find neither the warmth nor the food suited to their habits. But drain these soils, and they become light and porous, pervious to solar and atmospheric influence, the process of vegetable decomposition is accelerated, and a high state of fertility is developed.

One of the modern improvements in draining, which tends very much to give permanency to the work, is to dig the trench with a spade adapted to the purpose, with a wedge-shaped bottom, say three inches at the bottom, and five inches at the upper surface of the lower cut, and to fill this part with *broken* stone. The trench is dug two feet deep before this cut is made, and the wedge-shaped bottom cleaned with a scraper fitted for the purpose. By concentrating the water, it acquires force and keeps the passage open. And if broken stone is employed, not exceeding three inches in diameter, it affords no harbour for ground-mice or moles, which otherwise get in and open passages to the surface, through which water and earth are apt to enter and choke up the drain. Drains of this description are very efficient and economical to keep the bed of a road dry, placed either at its sides or in the centre, having a fall to carry off the water. A cubic yard of stone will lay about 120 feet of under drain of the dimensions above given, and eight inches deep. The breaking of the stone will cost three or four shillings the cubic yard.

The acknowledged utility of irrigation, or of

spreading, occasionally, the waters from streams or the highways over lands, has led to a misapprehension with many of the principles of draining. Irrigation is employed to furnish water to soils, generally slopes, where it is deficient, and from whence it speedily passes off, or to cover grounds in winter to exclude severe frosts. The water thus employed is nearly of the warmth of the atmosphere, and is generally charged with fertilizing properties. Draining is employed upon flat surfaces, or upon slopes abounding in springs, where there is an excess of water, and of a temperature which materially chills and deadens the soil. Irrigation supplies water where there is a deficiency, draining carries it off where there is an excess. Both are intended, by opposite modes, to produce the same result, a suitable degree of moisture for the wants of the crop.

We have illustrations in abundance of the advantages of draining; and so apparent have been its benefits in districts where it had a fair trial, that a knowledge of the science, for a science it may be called, is considered an important branch of agricultural knowledge. Upon one estate in Scotland, where the farmers are generally tenants, sixty-five miles of under-drains have been made within a few years, at the joint expense of the landlord and tenant. The benefits of this expenditure have been, to the landlord an additional 5*s.* per acre upon his annual rental, and to the tenants a more than corresponding advantage in the increase of their crops. A gentleman who deservedly ranks high in this society,* and who has been a pioneer in this branch of improvement, has assured me, in answer to my inquiries, that he has applied under-draining to twenty different fields, to the extent of more than two thousand rods, at the average cost of fifty cents

* The late H. W. Delavan, Esq.

per rod; and that he has been fully remunerated for the outlay in every instance, in the increased products of three years. In some cases, he adds, where the lands produced coarse grass of little value, and where tillage was out of the question, he has expended twenty dollars per acre in under-draining, and now grows upon these lands Indian corn, oats, wheat, and clover luxuriantly. The value of this land has been increased from 20 to 100 dollars per acre, or 500 per cent., by the operation of draining. I have had some personal experience in this sort of improvement, and have made it the subject of calculation; and am induced to believe that, where stone is convenient, efficient *permanent* under-drains may be made as low, if not lower, than what they cost my friend. A labourer accustomed to the work averaged ten rods per day upon my farm for thirty days. The ground was sandy and soft. Other materials were substituted for stone, which would, had they been employed, have required more labour, though they had been prepared to his hands.

The benefits of under-drains are not limited to lands which show water upon the surface. We may often notice at midsummer that some flat lands have a steril and compact appearance, whose general aspect would indicate fertility. This is readily accounted for by supposing, what is often known to be the fact, that the soil reposes upon a compact strata, which prevents the descent of water, and which has not sufficient inclination to pass it off. This water chills the ground, retards the decomposition of vegetable food, and causes comparative infertility. This may be effectually remedied by parallel under-drains, the space between them to depend upon the compactness of the soil, a drain being supposed to collect the water nine or ten feet on each side in the most tenacious ground. It is usual, where fields are thus drained, to make a

cross-drain along the upper side, and also one along the lower side, to receive and carry off the water which the parallel drains collect from the soil.

Barley and hops are becoming important staples of our state, particularly of the northern and western portions. Few persons, I presume, have a just conception of the quantity which we annually produce, or the immense loss we sustain for want of better knowledge, and more care in cultivating and preparing these crops for market. Our soil and climate are found to be well adapted to their growth, and we have produced as fine samples of both as are grown in any part of the world. Independent of an increasing home consumption, the hop in particular is always in demand for exportation. If in good condition, it is one of the most profitable crops to the grower that can be raised. If in bad condition, it is often a losing concern, not even affording a return for the labour bestowed in its culture.

Deeming the subject one of deep interest to the community, and as coming particularly within the province of this society, I have been at some pains to collect data from the best sources in relation to the barley and hop trade, with a view of submitting an abstract of the facts to your consideration.

Two thirds of all the barley grown in the United States is believed to be marketed at Albany and the neighbouring towns upon the Hudson. The amount brought to our market last year is estimated at 450,000 bushels. It is of two kinds, two-rowed and six-rowed; one possessing a thin and the other a thick skin, and larger berry, ill-adapted to be malted together, as one kind malts quicker than the other, and becomes sensibly deteriorated before the saccharine matter of the other kind is fully developed. The two varieties are often mixed by the grower; but that which passes through second hands, as the merchant, boatman, &c., is almost universally so, and is, besides, frequently adulterated with oats and other foreign matters, which seri-

ously depreciate its value. It is stated that the deterioration and loss consequent upon the bad condition of the barley brought to market the last season was equal to 10 per cent., or 45,000 bushels; which, expressed in money, at 75 cents the bushel, amounts to $33,750.

Serious as our loss seems to be from the bad management of our barley, it will be found to be no less so upon our hop crop. About 2300 bales, or 50,000 pounds, is the estimated quantity brought to market the last year. Of this quantity, I am assured, by the best judges of the article, there were not 200 bales which ought to have been denominated *first sorts*. Many of the hops were imperfectly dried, and, in consequence of the moisture in them when bagged, a fermentation was induced highly detrimental to their quality. The criterion by which hops are determined to be well dried, is when the stocks become perfectly shrivelled and dry. This is not found to be the case with those sent to this market; and the effect is, that deterioration goes on till the hops are used; whereas well-dried hops lose very little of their goodness by being kept over. Again, too much heat, particularly in the outset, is prejudicial; as it drives off with the moisture the aroma or essential oil which gives value to the hop. A great portion of our hops are picked too early, before they are sufficiently matured; while other parcels are scorched or otherwise injured in the process of curing; and although they might bear a superficial appearance of being prime, most of them, on critical examination, were found to be extremely deficient in the principle which gives them value. While the average price may be stated at 18 cents, many of these hops are declared not to have been worth two cents the pound.

Here, then, if the data which I have given are correct, are two of the staple productions of our soil on which we have lost, or, what amounts to the

same thing, have failed to realize from 50 to 100,000 dollars in a single year, *from carelessness, or a want of knowledge in their culture and preparation for market.* To what extent might this sum be swelled, were we to embrace in this inquiry the other products and labours of husbandry! A like disparity, I apprehend, between good and bad management would be found to exist in almost every department of our agriculture.

Division of labour, although not so well adapted to farm-labour as it is to the mechanic and manufacturing arts, is, nevertheless, susceptible of being advantageously studied and applied by the husbandman. The process of pinmaking is subdivided into seven branches, to each of which is assigned a distinct set of hands. The advantages which result from this arrangement may be appreciated when I state, that were the workmen who whiten the pins to perform all the different processes, they would cost in making "three times and three quarters as much as they now do by the application of the division of labour."* This principle is extensively adopted in manufactures, and is no inconsiderable cause of the reduction of the price of their fabrics. It has been advantageously introduced in the farming of Great Britain. Men are kept, as much as possible, to the same branch of labour, because, by becoming familiar with it, they perform more and do it better, as a great individual responsibility rests upon them. All light work is performed by women and children. A man who can earn six shillings should not be employed on what a boy can do equally well, who is paid two shillings per day Say a farm affords one hundred days of this kind of labour in a year, the gain to the cultivator by employing the boy instead of the man will amount to fifty dollars.

* Babbage on the Economy of Machinery.

New articles of culture.—Forty years ago cotton was hardly recognised as an article of culture in the United States. In 1832 it constituted by far our greatest material of export, the quantity exceeding three hundred and twenty-two millions of pounds, and the estimated value falling but a fraction short of thirty-two millions of dollars. In addition to this, the home manufacture of the raw material now gives employment to half a million of our population, while the goods fabricated from it constitute a material source of our internal commerce. Who can pretend to say what will be the great staples of our country forty years hence? Almost every discovery in science calls into existence a new art, and almost every new art furnishes a new demand for some product of the soil. It is the province of wisdom to keep pace with the knowledge of the times, that it may profit by its constant improvements. There is already an increasing demand for products of the soil which we have the ability to supply, but which we continue to import from Europe. Madder, woad, and weld are essential to our manufactures, and the quantity which is consumed draws no inconsiderable amount annually from our country. Our soil and climate are adapted to their culture, and with a little enterprise and experience we may soon be able to supply the home demand. The madder now imported is computed to cost more than two millions of dollars per annum.

The turnip culture will yet become, as it has proved in Britain, the basis of a great improvement in our husbandry. Turnips are, at the same time, an ameliorating and a cleansing crop, and are admirably fitted to precede barley or wheat. But their chief value consists in the abundant product, and the adaptation of the crop to the wants of all descriptions of farm-stock, at the time when succulent food is most wanted, and when it can be but

scantily supplied from other crops. The Swedish variety has a decided preference. On lands adapted to their culture, 600 bushels or twenty tuns of roots from the acre may be stated as a moderate average crop. The greatest objection to their culture is the labour and expense of securing them for winter use; but this is far greater in imagination than in reality. On this I can speak from personal experience. A neighbour raised last year from five acres of land three thousand bushels, which he has fed during the winter, and upon which he is now fattening more than one hundred wethers, besides oxen.

The raising of mulberry-trees and the production of silk is another branch of rural labour yet new among us, which bids fair to become a source of individual and national wealth, and which this society can enlighten and promote. The experiments already made have shown that, while the business abstracts very little labour from the ordinary employments of the farm, it is susceptible of yielding a handsome income to the farmer. The early attention of this society in distributing seed of the mulberry has done much towards introducing and extending this branch of labour. It is computed that that seed may have produced half a million of trees, and that this number may have been doubled by individual efforts in that time. A new species of the mulberry (*morus multicaulis*) has been introduced from the Philippine Islands, through France, by M. Perrottet, which promises new advantages in the production of silk. The tree is as thrifty, and as hardy, and as easily propagated as the white mulberry, while the leaves, being much larger, are far more easily gathered, and are said to be better adapted to the production of fine silk than the other species of this tree. The Asiatic mulberry was introduced into France in 1824, and in 1830 it bore seed abundantly.

The demand for silk fabrics is already great in

the United States, and is likely to increase in a far greater ratio than our population. The importation of silks in 1832 amounted to ten millions of dollars. As an article of export, the raw material will be in demand for the European, and the manufactured fabrics for the South American market. France imports raw silk to the value of 30,000,000 francs, and in Great Britain the annual importation of the article exceeds 120,000,000 dollars. Hence there is little danger of the market becoming overstocked.

The contrast in the profits of good and bad farming is worthy of a moment's notice, as few take the trouble to scan it with care. I have already alluded to the bad management of our hop crop. Had all the hops which were brought to this market the last year been equal in quality to the best, and such they probably might have been with better knowledge and more care in their management, some twenty or thirty thousand dollars might have been put in the pockets of the growers, which they failed to obtain. Let us examine what the difference is in the corn crop. I estimate the cost of cultivating and harvesting an acre of corn at fifteen dollars, and that a farmer will ordinarily plant four acres. His expense, then, will be sixty dollars. If the crop yields him thirty bushels an acre—and more falls short than goes over this quantity—and he sells the product at fifty cents the bushel, he will be remunerated for his labour, but get not a cent of profit. *Now if, instead of thirty, the acre was made to produce, by good management, eighty bushels, the four acres, at the assumed price, would pay for the labour, and afford him a nett profit besides of one hundred and thirty dollars.* Here, then, would be a difference, in one year, in the profits of four acres, of $130, all resulting from good and bad management. I beg leave here, as affording to my hands a happy illustration of the contrast I would exhibit, the

practice of an individual who stands deservedly high as a practical farmer,* and as a gentleman of respectability and veracity. I will first show what his land DID produce, and then what it DOES produce. "The land I now till," he observes, "*at first* would not produce, on an average, more than fifteen or twenty bushels of corn, ten or fifteen bushels of wheat, barley, or rye, and from half a tun to one tun of hay." By good management, economizing manures, and a proper rotation of crops, he adds, "Some of my fields *now yield* from eighty to one hundred bushels of corn, thirty-five to forty bushels of wheat, fifty to sixty of barley, and from two and a half to three and a half tuns of hay per acre, *and with less labour* (except in harvest) *than when I did not raise more than one third or one quarter as much per acre as I do now.*" The same intelligence and industry that have trebled or quadrupled the profits of this farm, will produce like results whenever they are diffused and brought into exercise.

I have thus adverted, gentlemen, to those defects in our husbandry to which I proposed at this time to call your attention, and have endeavoured to show their magnitude, and the importance of applying efficient remedies. I will now call your attention to some of the available means of placing our agriculture on a more respectable and productive basis. The means which I shall particularly commend to your notice may be embraced under the following heads:

1. A school, to illustrate the principles of science upon which the labours of agriculture are based, and to teach the best models of practice.

2. A more general diffusion of useful knowledge, in a cheap form, accessible to the humblest condition in life.

3. Agricultural associations; and,

* Earl Stimson, of Galway.

4. The bestowment of pecuniary rewards, as stimulants to enterprise and industry.

I need not stop to dwell upon the advantages which learning affords to agricultural labour. Science may be defined a study of the immutable laws of the Creator, which govern and regulate mind and matter. The study of these laws, and their application to the wants and comforts of life, have for ages constituted one of the highest and most useful employments of man; and have contributed more than any other human effort to refine and elevate us above the grosser and degraded condition of savage life. The concentrated benefits of these labours are now proffered to our hands. The pleasures and the benefits which they impart are held out as noble rewards to mental labour, in the same spirit that the blessings of health and competence are promised to him who "earns his bread by the sweat of the brow." Labour, mental or bodily, is the inseparable attendant of rational enjoyment. And is that knowledge to be contemned which has done so much good to the world, and which has countless blessings yet in store for the human family? "In a *theological* view," says a late eminent writer,* "science is nothing else than a rational inquiry into the arrangements and operations of the Almighty, in order to trace the perfections therein displayed. And what," continues our author, "are the truths which science has discovered? They may be regarded as so many rays of celestial light descending from the Great Source of Intelligence to illuminate the human mind in the knowledge of the divine character and government, and to stimulate it to a still more vigorous exertion in similar investigations, just as the truths of revelation are so many emanations from the 'Father of Lights,' to

* Dick on the Improvement of Society by the Diffusion of Knowledge.

enlighten the darkness and to counteract the disorders of the *moral* world."

Our state may be compared to a great family, the members of which are employed in diversified pursuits, all designed and calculated to promote the common weal; having a common as well as individual object, and all united by reciprocal ties. In this light it is considered as respects crime and want. One is punished, and the other relieved, by common consent and at the common charge. We have erected splendid and extensive establishments for the vicious and the poor. The county of Albany has been at greater expense for its poor than would be required of the state to establish and support a school of agriculture. Would it not evince both prudence and economy to endeavour to *prevent* or to *lessen* these growing evils in society, by devoting a portion of the common means to schools, which should teach the hands useful labour, and imbue the heart with the love of virtue? The adage teaches that "an ounce of prevention is worth a pound of cure." If ignorance be one of the chief causes of vice, and indolence the parent of want; and if knowledge be one of the mainsprings of virtuous conduct, and competence the sure reward of industry; then the more knowledge is diffused, and the more that industry is encouraged, the less we shall be called upon to expend upon poorhouses and penitentiaries. It no longer admits of doubt that knowledge and industry are the great conservators of public morals, as well as the great instruments of public wealth.

It has been remarked, that the more we provide for any one class, the more it will increase. This would seem to hold good in regard to the vicious propensities of our nature, and why not in regard to habits that are commendable and praiseworthy?

To speak practically: Our agriculture is greatly defective. It is susceptible of much improvement.

How shall we effect this improvement? The old are *too old to learn*, or, rather, to unlearn what have been the habits of their lives. The young cannot learn as they ought to learn, and as the public interests require, because they have no suitable school for their instruction. We have no place where they can learn the *principles* upon which the *practice* of agriculture is based; none where they can be instructed in all the modern improvements of the art. It is devoutly to be hoped that our fathers in council, justly appreciating the importance of the subject, will add another to the proud trophies which New-York has already won in the noble march of improvement, by properly responding to the correct views of this subject expressed in the message of our chief magistrate.

In referring to *agricultural associations* as a means of improvement, I think I shall be sustained by the opinions of those present, as well as by the authority of past experience, in the little I have to say. These associations tend to promote social and friendly intercourse, and an interchange of kind offices; to make our farmers emulous of excelling in their cattle, in their crops, their buildings, and in the neatness and order of their domestic arrangements; they bring them acquainted with each other's improvements and means of economizing labour; instruct them in the comparative value of breeds of animals, and the relative value of crops. They promote industry, frugality, and the love of knowledge. They tend to multiply our comforts and increase our wealth, by the laudable emulation they call into action, and to enlighten and embellish our country.

And yet I am sensible that those associations find but comparatively few ardent advocates among our farmers. Many are indifferent because they do not appreciate their benefits, or from an apathy common to our nature, in every measure which does not

promise present gain. Some will not support them, lest they should lose a day or a dollar. And others oppose them from an envious wish to deprive their neighbours of that public commendation which they are conscious they do not themselves deserve and are not likely to obtain. The man who thinks and acts only for *self*, regardless of the welfare of those around him, and who fancies that he rises because others sink, mistakes alike his interest and his duty, and is a stranger to those ennobling feelings which flow from disinterested acts of benevolence and philanthropy. If the comparison may be tolerated, I would liken the selfish man to the moon, whose sombre rays impart no vivifying influence upon terrestrial objects: and his contra to the sun, shedding abroad on every side his effulgent beams, and dispensing life, light, and gladness to all around.

The remaining subject which I proposed to notice is the awarding premiums for beneficial experiments and improvements in husbandry. I confess I am not satisfied of the utility of paying for the *largest* products or the *fattest* animals, yet I believe there are many other subjects on which premiums may be awarded with public advantage. If my neighbour shall be induced, by the expectation of a premium, to make some new application of science, or some new experiment in practical husbandry, which shall prove successful, and lead to important public benefits, we become gainers, however expensive the investigation or the experiment may have been to him who obtains the premium. In this way great public improvements have accrued; and like means will produce like results. These rewards are often the exciting cause to active industry, philosophical research, and to the development of inventive genius; which, like the seed whose latent vitality is quickened into action by solar influence, grows, expands, and matures into fruits of usefulness. Go to the American Institute

at New-York, and see the numerous productions which its premiums are eliciting from science and art. Look at Scotland, a country which is surpassed by none in recent improvements in husbandry, and where agricultural premiums have been awarded for fifty years, and see its society distributing nearly ten thousand dollars a year as rewards for diligence and skill displayed in her rural affairs. But I need not seek for illustrations abroad. They abound in every county in our state where premiums have been awarded. Upon this subject I quote again my highly respectable correspondent, who remarks in strong language, "I have no doubt that the money which was appropriated by the state to encourage agriculture, has increased the wealth of this county more than twenty per cent. a year."

I have thus gone through with what I proposed to embrace in this address. I have pointed out some of the prominent defects in our husbandry, and have suggested means of remedying them at least in part. The means are partially at your command, and over them all you can exercise a salutary influence. I hope the present opportunity will not be suffered to pass without a united and successful effort to advance the objects of public usefulness for which we have associated, and for which we have met on this occasion.

CATTLE AND SHEEP HUSBANDRY.

CHAPTER I.

Points by which Livestock are judged.

Were an ox of fine symmetry and high condition placed before a person not a judge of livestock, his opinion of its excellences would be derived from a very limited view, and, consequently, from only a few of its qualities. He might observe and admire the beautiful outline of its figure, for that might strike the most casual observer. He might be pleased with the tint of its colours, the plumpness of its body, and the smoothness and glossiness of its skin. He might be even delighted with the gentle and complacent expression of its countenance. All these properties he might judge of by the eye alone. On touching the animal with the hand, he could feel the softness of its body, occasioned by the fatness of the flesh. But no man, not a judge, could rightly criticise the properties of an ox farther. He could not possibly discover, without tuition, those properties which had chiefly conduced to produce the high condition in which he saw the ox. He would hardly believe that a judge can ascertain, merely by the eye, from its general aspect, whether the ox were in good or bad health; from the colour of its skin, whether it were of a pure or cross breed; from the expression of its countenance, whether it were a quiet feeder; and from the nature of its flesh, whether it had arrived

at maturity or no. The discoveries made by the hand of a judge might even stagger his belief. He could scarcely conceive that that hand can feel a hidden property—the touch—which of all tests is the most surely indicative of fine quality of flesh and of disposition to fatten. It can feel whether that flesh is of the most valuable kind; and it can foretel the probable abundance of fat in the interior of the carcass. In short, a judge alone can discriminate between the relative values of the different points, or appreciate the aggregate values of all the points of an ox. The parts of the ox by which it is judged are called "*points*."

We have thus seen that a person even totally ignorant of cattle may judge of some of the most apparent properties or points of a *fat* ox; but were a *lean* ox placed before him, he would be quite at a loss what opinion to pass on its present, and far more of its future condition. The outline of its figure would to him appear rugged and angular, and, consequently, coarse. To him the body would feel a number of hard bones, covered with tough skin and coarse hair. A judge, on the other hand, can at once discover the good or the bad points of a lean as well as of a fat ox; because the properties of the former are the same in kind, though not in degree, as those of the latter; and in accordance with the qualities of these points, he can anticipate the future condition of the lean ox, save and excepting the effects of accidents and disease.

But it may be asked, if a judge of cattle is a character so easily attained as is here represented, how is it that the opinion of a judge is always held in deference, and is always referred to in cases of difference of opinion? This question admits of a very satisfactory answer. Errors in the judging of cattle arise not so frequently from not knowing the points to be judged of, as from judges allowing one or more of their favourite points the power of too

great an influence over the future increasing condition of the ox; and as long as there are so many points to be considered, and as most of them may be partially altered by local circumstances, a difference of opinion may exist among judges of lean stock.

Now, what are those *points* of an ox, a thorough knowledge of which is so essential to constitute a perfect judge? Could they be described and illustrated with such precision, as that they may be applied at once to every ox, in whatever condition it may be, a great advancement would be made towards establishing fixed rules for the right judging of all the domestic animals. Fortunately for the suppression of human dogmatism on this subject, Nature herself has furnished rules for ascertaining points for judgment, which can only be discovered by long and constant practice. Nevertheless, I shall endeavour to describe them plainly, and, after perusing the description, I hope my readers will perceive that they are established laws of nature, and are, therefore, unerring and applicable to every species of cattle. Like other phenomena of nature, a knowledge of them can be acquired by observation. This knowledge is the most difficult which a farmer has to acquire, inasmuch as the management of livestock is a much more difficult branch of husbandry than the cultivation of corn. And although the importance of this knowledge is acknowledged by every experienced farmer, and a desire for its acquirement is strongly felt by every young one, it is remarkable that very little is said in professed works on agriculture on those rules which guide us in judging of fat or lean livestock.

The first *point* to be ascertained in examining an ox is the *purity* of its breed, whatever that breed may be. The ascertainment of the purity of the breed will give the degree of the disposition to fatten in the individuals of that breed. The purity of

the breed may be ascertained from several marks. The colour or colours of the skin of a pure breed of cattle, whatever those colours are, are always definite. The colour of the bald skin on the nose and around the eyes in a pure breed is always definite, and without spots. This last is an essential *point*. When horns exist they should be smooth, small, tapering, and sharp-pointed, long or short, according to the breed, and of a white colour throughout in some breeds, and tipped with black in others. The shape of the horn is a less essential point than the colour.

Applying these marks on the different breeds in Scotland, as illustrations of the points which we have been considering, we have the definite colours of white and red in the Short-horns. The colour is either entirely white or entirely red, or the one or the other predominates in their mixture. The skin on the nose and around the eyes is uniformly of a rich cream-colour. The Ayrshire breed in its purity is also distinguished by the red and white colour of the skin, but always mixed, and the mixture consists of spots of greater or smaller size, not blended together. The colour of the skin on the nose and around the eyes is not definite, but generally black or cream-coloured. In other points, those two celebrated breeds differ from one another more than in the characters which I have just described. In the West Highland, Angus, and Galloway breeds, the colour of the skin is mostly black in the animals of the purest blood, although red, dun, and brindled colours are occasionally to be seen among them. The black colour of the skin of the nose and around the eyes is indicative of the pure blood of black-coloured cattle, but a cream-coloured nose may frequently be observed among the other colours of skin. It would perhaps be hazardous to assert, in the case of the West Highlanders, that the characters above given are the

only true indications of the pure breed, for their origin cannot now be certainly determined; but the characters given will certainly apply to the purity of the blood in the short-horns and Ayrshire breeds.

The second *point* to be ascertained in an ox is the form of its carcass. It is found, the nearer the section of the carcass of a fat ox, taken longitudinally vertical, transversely vertical, and horizontally, approaches to the figure of a parallelogram, the greater quantity of flesh will it carry within the same measurement. That the carcass may fill up the parallelogram as well as its rounded form is capable of filling up a right-angled figure, it should possess the following configuration. The back should be straight from the top of the shoulder to the tail. The tail should fall perpendicularly from the line of the back. The buttocks and twist should be well filled out. The brisket should project to a line dropped from the middle of the neck. The belly should be straight longitudinally, and round laterally, and filled at the flanks. The ribs should be round, and should project horizontally, and at right-angles to the back. The hooks should be wide and flat; and the rump, from the tail to the hooks, should also be flat and well filled. The quarter, from the itch-bone to the hook, should be long. The loin-bones should be long, broad, and flat, and well filled; but the space between the hooks and the short ribs should be rather short, and well arched over with a thickness of beef between the hooks. A long hollow from the hooks to the short ribs indicates a weak constitution and an indifferent thriver. From the loin the shoulder-blade should be nearly of one breadth, and from thence it should taper a little to the front of the shoulder. The neck-vein should be well filled forward, to complete the line from the neck to the brisket. The covering on the shoulder-blade should be as full out as the buttocks. The middle ribs

should be well filled, to complete the line from the shoulders to the buttocks along the projection of the outside of the ribs.

These constitute all the *points* which are essential to a *fat* ox, and which it is the business of the judge to know, and by which he must anticipate whether the lean one, when fed, would realize. The remaining points are more applicable in judging of a lean than a fat ox.

The first of the *points* in judging of a *lean* ox is the nature of the *bone*. A round thick bone indicates both a slow feeder and an inferior description of flesh. A flat bone when seen on a side view, and narrow when viewed either from behind or before the animal, indicate the opposite properties of a round bone. The whole bones in the carcass should bear a small proportion in bulk and weight to the flesh, the bone being only required as a support to the flesh. The texture of the bone should be small-grained and hard. The bones of the head should be fine and clean, and only covered with skin and muscle, and not with lumps of fat and flesh, which always give a heavy-headed, dull appearance to an ox. The forearm and hock should also be clean and full of muscle, to endure travelling. Large joints indicate bad feeders. The neck of an ox should be, contrary to that of the sheep, small from the back of the head to the middle of the neck. The reason of the difference, in this respect, between the ox and the sheep is, that the state of the neck of the ox has no effect on the strength of the spine.

A full, clear, and prominent eye is another *point* to be considered; because it is a nice indication of good breeding. It is always attendant on fine bone. The expression of the eye is an excellent index of many properties in the ox. A dull, heavy eye certainly indicates a slow feeder. A rolling eye, showing much white, is expressive of a rest-

less, capricious disposition, which is incompatible with quiet feeding. A calm, complacent expression of the eye and face is strongly indicative of a sweet and patient disposition, and, of course, kindly feeding. The eye is frequently a faithful index of the state of the health. A cheerful clear eye accompanies good health; a constantly dull one proves the probable existence of some internal lingering disease. The dulness of the eye, arising from the effect of internal disease, is, however, quite different in character from a natural or constitutional phlegmatic dulness.

The state of the skin is the next *point* to be ascertained. The skin affords what is technically and emphatically called the *touch*, a criterion second to none in judging of the feeding properties of an ox. The touch may be good or bad, fine or harsh, or, as it is often termed, hard or mellow. A thick, firm skin, which is generally covered with a thick-set, hard, short hair, always touches hard, and indicates a bad feeder. A thin, meager, papery skin, covered with thin silky hair, being the opposite of the one just described, does not, however, afford a good touch. Such a skin is indicative of weakness of constitution, though of good feeding properties. A perfect touch will be found with a thick, loose skin, floating, as it were, on a layer of soft fat, yielding to the least pressure, and springing back towards the fingers like a piece of soft, thick chamois leather, and covered with thick, glossy, soft hair. Such a collection of hair looks rich and beautiful, and seems warm and comfortable to the animal. It is not unlike a bed of fine soft moss, and hence such a skin is frequently styled "mossy." The sensation derived from feeling a fine touch is pleasurable, and even delightful, to an amateur of breeding. You cannot help liking the animal that possesses a fine touch. Along with it is generally associated a fine symmetrical form. A

knowledge of touch can only be acquired by long practice; but, after having acquired it, it is of itself a sufficient means of judging of the feeding quality of the ox; because, when present, the properties of symmetrical form, fine bone, sweet disposition, and purity of blood, are the general accompaniments.

These are the essential *points* of judging *lean* cattle; but there are other and important considerations which must claim the attention of the judge in forming a thorough judgment of the ox.

The *proportion* which the extremities bear to the body and to one another is one of these considerations. The head of the ox should be small, and set on the neck as if it appeared to be easily carried by the animal. This consideration is of great importance in showing cattle to advantage in the market. The face should be long from the eyes to the point of the nose. No face can be *handsome* without this feature. The scull should be broad across the eyes, and only contract a little above them, but should taper considerably below them to the nose. The muzzle should be fine and small, and the nostrils capacious. The crown of the head should be flat and strong, and the horns should protrude horizontally from both sides of it, though the direction of the growth from the middle to the tip varies in the different breeds. The ears should be large, stand a little erect, and so thin as to reflect the bright sunlight through them. The neck should be light, tapering from the front of the shoulder and neck-vein, with a gradual rise from the top of the shoulder to the head. The length of the neck should be in proportion to the other part of the animal; but this is a non-essential point, though I would prefer an apparently short neck to a long one, because it is generally well covered with the neck-vein. A droop of the neck, from the top of the shoulder to the head, indicates a weakness of

constitution, arising frequently from breeding too near akin. The legs below the knee should be rather short than long, and clean made. They should be placed where they apparently bear the weight of the body most easily, and they should stand wide asunder. The tail should be rather thick than otherwise; a thickness indicates a strong spine and a good weigher. It should be provided with a large tuft of long hair.

The *position* of the *flesh* on the carcass is another great consideration in judging of the ox, the flesh on the different parts of the ox being of various qualities. That part called the sparerib in Edinburgh, and the fore and middle ribs in London, the loins, and the rump or hookbone, are of the finest quality, and are generally used for roasts and steaks. Consequently, the ox which carries the largest quantity of beef on these *points* is the most valuable. Flesh of fine quality is actually of a finer texture in the fibre than coarse flesh. It also contains fat in the tissue between the fibres. This arrangement of the fat and lean gives a richness and delicacy to the flesh. The other parts, though not all of the same quality, are used for salting and making soups, and do not fetch so high a price as the part just described.

A full twist lining the division between the hams, called the "closing," with a thick layer of fat, a thick flank, and a full neck-vein, are generally indicative of tallow in the interior of the carcass; but it frequently happens that all these symptoms of laying on internal fat fail. The disposition to lay on internal fat altogether depends on the nature of the individual constitution; for it is often observed that those individuals which exhibit great fattening *points* on the exterior, do not fill with internal fat so well as others which want these points. On the contrary, thin-made oxen, with flat ribs and large bellies, very frequently produce large quantities of internal fat.

The first part which shows the fat in a feeding ox is the point or top of the rump, which, in high-bred animals, is a prominent point; sometimes it protrudes too much, as the mass of *fat* laid on these is out of proportion to the *lean*, and therefore useless to the consumer. This is the part which frequently misleads young or inexperienced judges in the true fatness of the ox, because fat may be felt on this part when it is very deficient on most of the other points.

The parts, on the other hand, which are generally the last in being covered with flesh, are the point of the shoulder joint and the top of the shoulder. If these parts are, therefore, felt to be well covered, the other and better parts of the animal may be considered ripe. Ripeness of condition, however, can only be rightly ascertained by handling; for there is a great difference between the *apparent* and real fatness of an ox. The flesh of an apparently fat ox to the eye may, on being handled by a judge, feel loose and flabby; but a truly fat ox always feels "hard fat." With such the butcher is seldom deceived, while loose handlers give no assurance of killing well.

It is proper, in judging of the weight of a fat ox, to view his gait while walking towards you, which will, if the ox has been well fed, be accompanied with a heavy rolling tread on the ground. In this way a judge can at once come very near to its weight.

The application of all these rules and considerations to the judging of *lean* stock constitutes the chief difficulty to the judge. An ox in high condition, in so far as its condition alone is under consideration, can be judged of, as we have seen, by any one; and sometimes the fatness may be so great as obviously to deform the symmetry to any observer. The superiority of a judge to others, in these cases, consists in estimating the weight, observing the

purity of the blood, and valuing the points of the animal. But, in judging of a lean ox, its future condition and symmetry must be foreseen. The rules which I have attempted to describe will, if studied practically, enable an inquiring observer to foresee these points; and, in judging between a number of valuable points, it should be remembered that purity of breeding will always ensure aptitude to fatten, which, in its turn, will ensure the largest remuneration for the food consumed.

Sheep, both fat and lean, may be judged of by nearly the same rules. The purity of breeding will be seen in the large, full, prominent eyes, the clean, thin bone of the head and legs, and the large, thin, pricked-up ears set on each side of the top of the head, and in the short, thick, smooth, clear hair of the face and legs. The section of the form of the fat sheep is even more mathematically like a parallelogram than that of the fat ox. The touch of the skin is also the same in kind, and is as sure an indication of the disposition to fatten as in the ox. In regard that wool varies so greatly in the many breeds of sheep, I can only make this general remark on the fleece best suited to every breed, namely, the whole body should be well covered with wool, with the exception of the face and legs, which are always covered with hair. A large covering of wool not only protects them against the inclemencies of the weather, and the coldness and dampness of the ground, but it supplies a large fleece to be disposed of to the wool-buyer. One deviation from the rules of judging cattle must be made while judging sheep, to which I have already alluded, namely, while the neck of the ox should be thin, that of the sheep should be thick; because a thin-necked sheep is found to possess a weak spine, and is generally a bad feeder. A thin neck has thus the same effects on sheep that a small tail has on cattle. As in cat-

tle, a drooping neck in sheep indicates a weakness of constitution, arising from breeding in-and-in.

Some of the rules for cattle and sheep are applicable to swine. Swine should have broad straight backs, round ribs, thin hair, thin skin, small tails, short and fine muscles, pricked ears, small and fine bones, and round and well-turned shoulders and hams.

In conclusion, it is obvious that these rules for judging livestock are not founded upon arbitrary assumptions. Had no *natural* means of judging existed, man could no doubt have contrived rules to suit his own convenience; and in such a case he would probably have chosen such as he could have most easily applied; but unless they could be applied to the *growing* as well as to the *mature* condition of animals, they would be of little value. But we have seen that natural means of judging *do* exist, and although they cannot be easily understood without much observation and practice, yet by practice they can be acquired, and easily applied to the existing circumstances of the animal, whatever these may be. Any person, it is true, cannot at once perceive that their necessary tendency is to lead to a correct judgment. Long and careful personal observation is requisite to convince the mind of their value in that respect. Tuition, without practical observation, cannot of itself do it. It has been the study of nature, in short, which has enabled man to establish these rules for his guidance; and as all the operations of nature are regulated by general laws, these rules must be of universal application. It is clearly established by observation, as a uniform principle of judgment, that when an ox, in a growing state, presents a certain degree of purity of breeding, a certain form of body, and a certain kind of handling of its skin, a certain result is undeviatingly exhibited in the mature state from these given premonitory symptoms. Should this result

conduce to the acquisition of wealth, we are anxious to possess the growing animal which exhibits such favourable points; and, on the other hand, we are as anxious to avoid the possession of that animal which exhibits unfavourable points, unless at a very depreciated value. Now it has been ascertained by experience, that pure breeding, perfect form, and fine touch, make the best mature animal. Hence *these points* will ensure both the growing and mature animal a ready market and good price; and hence, also, that breed which constantly presents these points, deserves, by its intrinsic worth, to be generally cultivated.

On the application of the points by which livestock are judged.—1. *To short-horns.*—Having in my former paper (see Cultivator, vol. i., p. 134) enumerated the *points* and form by which the value of an ox or any breed ought to be ascertained, let us now apply them to the prevailing breeds of cattle, that we may thereby discover which is the most valuable one existing; and, after having ascertained that by comparison, we will then be prepared to consider whether the less valuable breeds might not be improved by intermixture with the most valuable, or, at least, whether such attempt at crossing would be beneficial to the country.

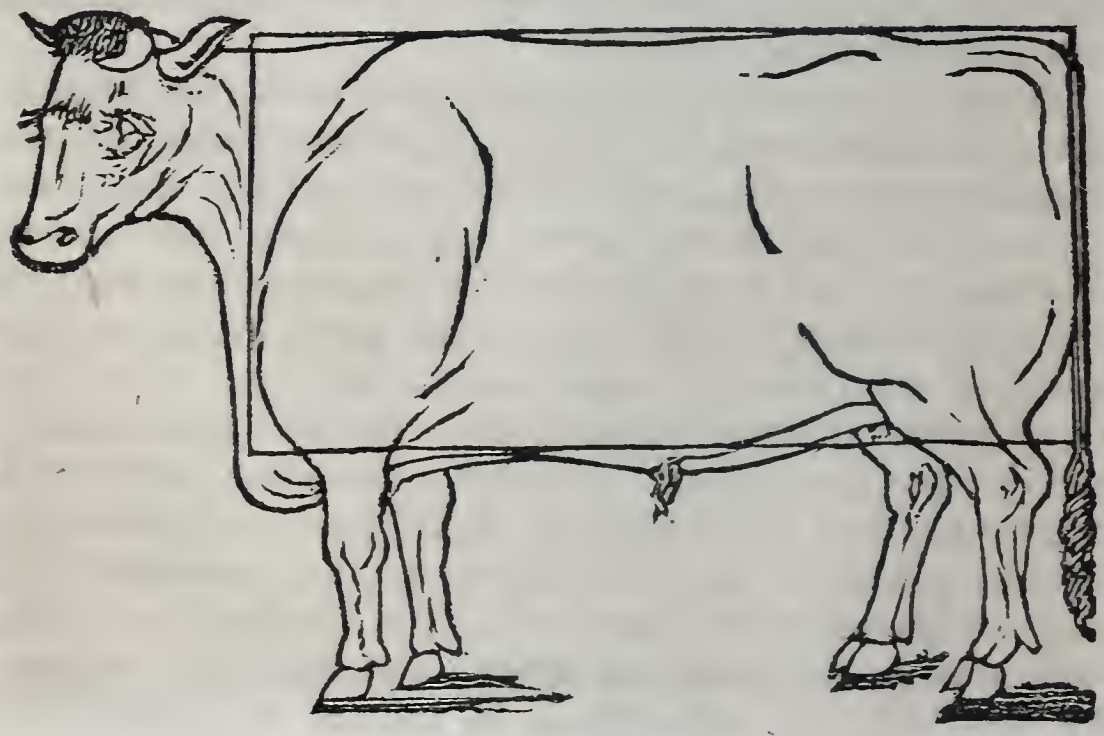
Before proceeding with this interesting investigation, I may remark, that the points and form recommended for general application are neither imaginary nor arbitrary; on the contrary, they have been discovered and established by long experience patiently acquired, and they have now received the general sanction of competent judges: in short, they form the rule of judgment for our best practical judges of cattle. It may have been observed, however, that I have hitherto applied the rule bony to *oxen*, and it may therefore be very reasonably demanded whether it applies as well to heifers, bulls, and cows. To this I answer, that it applies to every age, sex, and condition of cattle, and that if it

did not, it could not be maintained and recommended as a *general* rule; but in its application to bulls and cows there is a slight deviation occasioned by sexual development. In the bull, age produces an enlargement of the muscles of the neck, and a fulness of the gristle, and a consequent dependance under the brisket; these are marks of *virility* besides others, which cannot exist in the ox; and in the cow, age produces a thinness in the buttocks and an enlargement of the abdomen, and a consequent depression of the loins; these being marks of *calf-bearing* which cannot exist in the heifer. In all other respects in regard to general form, points, quality, and good-breeding, the rule applies as strictly to the bull, the cow, and the heifer, as to the ox.

Of the various prevailing breeds of cattle in Scotland which I shall enumerate and apply the rule of judgment to, I shall begin with the *Short-horns*.

When we survey the frame of a short-horn ox, we have a straight level back from behind the horns to the top of the tail, full buttocks, and a projecting brisket; we have, in short, the rectangular form, as represented in a side view by this Fig. 1; we have,

Figure 1.



also, the level loin across the hook bones, and the level top of the shoulder across the ox, and perpendicular lines down the hind and fore legs on both sides, these constituting the square form, when the ox is viewed before and behind, as represented in Figs. 2 and 3; and we have straight parallel lines

Figure 2.

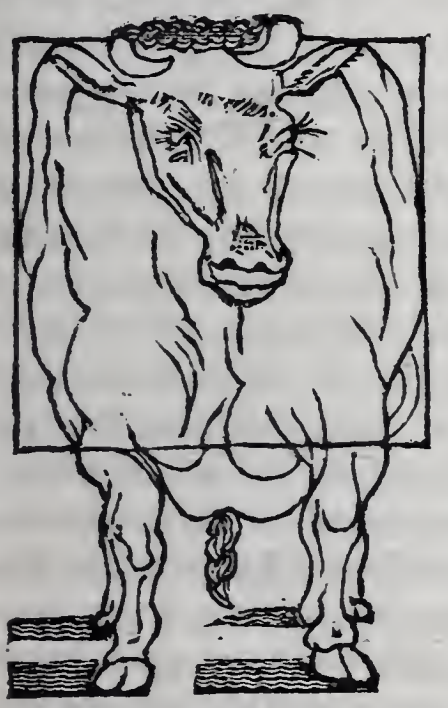
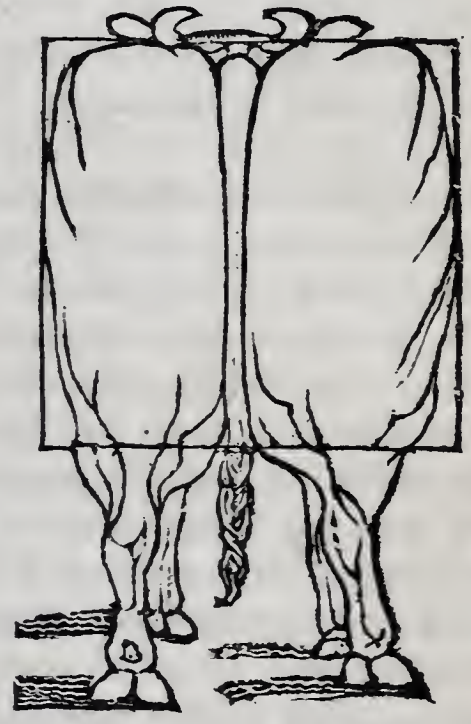


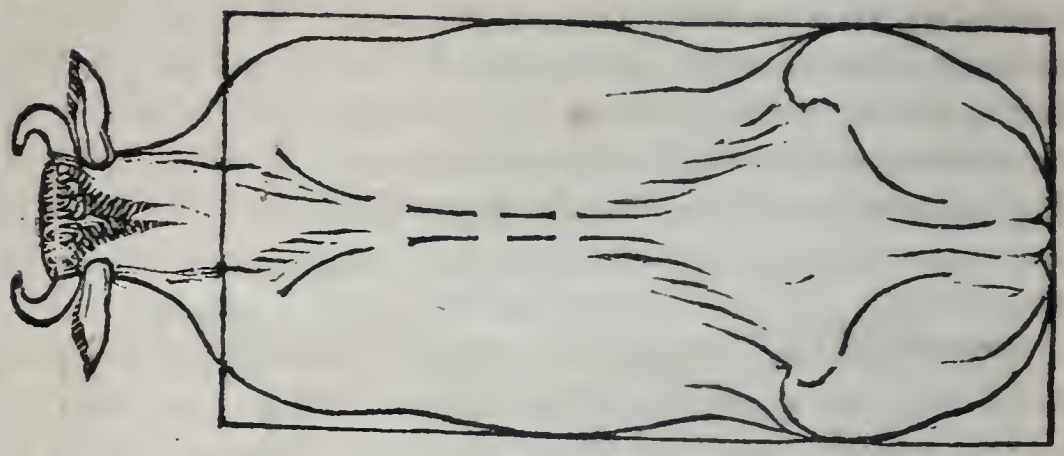
Figure 3.



from the sides of the shoulders along the outmost points of the ribs to the sides of the hind quarters, and we have these lines connected at their ends by others of shorter and equal length, across the end of the rump and the top of the shoulder, thus constituting the rectangular form of the ox when viewed from above down upon the back, as represented by Fig. 4. We have, in this manner, the form of the short-horn ox and heifer in perfect accordance with the diagrams of the rule.

Farther, I should be inclined to assert, although I have not directed my attention to the fact sufficiently to be able to prove the assertion from examples, that the carcass of a full-fed, symmetrical short-horn ox, included within the rectangle, is in length double its depth, and its depth equal to its breadth. Hence,

Figure 4.



Figs. 2 and 3 are squares, and Figs. 1 and 4 each two similar squares, placed in juxtaposition. The short-horn bull deviates from the rule in a rising of the neck, a dependance under the brisket, and a fulness of the neck-vein; the cow only a little from the ox or heifer in a thinness in the buttocks, and besides this, when aged, in an enlargement of the belly, and mostly, though not always, in a hollowness of the loins. The *form*, therefore, of the short-horn breed is perfectly according to the rule.

In its *points*, that for quantity and well-laid-on beef, the short-horn ox is quite full in every valuable part, such as along the back, including the fore-ribs, the sirloins and rumps, in the runners, flanks, buttocks, and twist, and in the neck and brisket as inferior parts. In regard to quality of beef, the fat bears a due and even preponderating proportion to the lean, the fibres of which are fine and well-mixed, and even marbled with fat and abundantly juicy. The fine, thin, clean bone of the legs and head, with the soft, mellow touch of the skin, and the benign aspect of the eye, indicate in a remarkable degree the disposition to fatten; while the uniform colours of the skin, red or white, or both, commixed in various degrees—bare cream-coloured skin on the nose and around the eyes, and fine, tapering, white or light-coloured horns—mark distinctly the purity of the blood. These points of blood, and quality,

and quantity of beef, apply equally to the bull, the cow, and the heifer, as to the ox. Combining all these properties of points and form, we shall find that the short-horn breed illustrates, in a very satisfactory manner, the application of the general rule which has been explained. On account of its valuable properties, this breed demands farther illustration.

The external appearance of the short-horned breed is irresistibly attractive. The exquisitely symmetrical form of the body in every position, bedecked with a skin of the richest hues of red and the richest white, approaching to cream, or both colours, so arranged or commixed as to form a beautiful fleck or delicate roan, and possessed of the mellowest touch; supported on small, clean limbs, showing, like those of the racehorse and the greyhound, the union of strength and fineness; and ornamented with a small, lengthy, tapering head, neatly set on a broad, firm, deep neck, and furnished with a small muzzle, wide nostrils, prominent, "mildly-beaming" eyes, thin, large, veiny ears, set near the crown of the head, and protected in front with semicircularly bent, white or brownish-coloured, short (hence the name), smooth, pointed horns; all these several parts combine to form a symmetrical harmony, which has never been surpassed in beauty and sweetness by any other species of the domesticated ox.

Enthusiastic as this language may be considered when applied to the external beauty of cattle, it is not more so than the beauty of cattle is entitled to; for when it is considered that symmetry of form generally accompanies mellowness of touch in the skin, and that both constitute the true index to a disposition to fatten, the most *useful property of all*, beauty of external appearance is too valuable a criterion to be overlooked. Fortunately, indeed, beauty cannot be overlooked in cattle; for, even were

it useless, it is so irresistibly engaging, that the judgment of a stoic would be biased in its favour. To my taste, nothing can be so attractive, as a spectacle of the kind, as a show of fine-bred short-horns in high condition, such as are to be seen at Dunse June fair, or the monthly markets at Kelso and Coldstream in May and June.

Breeding in-and-in.—The preservation of the valuable breed of short-horns is a consideration of paramount importance; and, fortunately, it is in the power of breeders themselves to secure it. It consists entirely in maintaining the *purity of blood in vigour.* This desirable end is best secured by avoiding, on the one hand, the evil of breeding in-and-in, that is, the union of too close relationship in blood, and, on the other, too violent a cross. A strong mark of the purity of blood being in vigour is the circumstance of like producing its like; and no breed will in this respect incur so little disappointment to the breeder as short-horns, after a proper selection of the dam and sire.

The evil of breeding in-and-in, or, in other words, producing too great refinement of tone, is manifested, in the first instance, by a tenderness of constitution, the animals not being able to withstand the extremes of heat and cold, rain and drought. If the evil is prolonged through several generations, the forms of the animals become affected, the bone becomes very small, the neck droops, the skin of the head becomes tight and scantily covered with hair, the expression of the eye indicates extreme sensibility, the hair on the body becomes thin and short, and the skin as thin as paper; the *points* continue good, and predisposition to fatness increases, but the whole carcass becomes much diminished in size, though retaining its plumpness and beautiful symmetry. The evil, however, does not terminate in the production of these symptoms. Internal diseases ensue, such as disorganization of the

liver or rot, polypi in the trachea or clyeis, malformation of the bones of the neck and legs, and general deformity.

It is true, that both Mr. Bakewell and the Messrs. Collins bred much in-and in. Such a practice may be excusable in those who are attempting to establish a particular kind of stock, as by that means it will be sooner brought to maturity. But the same license cannot with propriety be taken by breeders who have abundance of well-bred stock within their reach from which to select their breeding stock. The invariably injurious tendency of breeding in-and-in proves that nature herself places a barrier against abuse in breeding.

Choice of Bulls.—The practice of breeding in-and-in leads me to remark on the subject of judging of large and small bulls. I have had frequent opportunities of observing that premiums at local shows are given by the judges to *large* bulls. This I conceive a great mistake. In my opinion, the size of a bull ought to be considered of secondary importance in judging of him as a breeding animal. That which shows the greatest number of good *points* ought to be chosen, and these should be counted by the judges. One bull may possess one point better than another; but that one possessing the greatest number of points ought to be preferred, particularly among a competition of aged bulls. Some young bulls, it is true, do not show their points till they are one or even two years old, while others show them from the first. When all the points are not visible on a young bull, he must be partly judged of by his pedigree. If the blood is well descended, free from intermixture, and not too nearly related in blood on both sides, then a young bull may be safely judged of by his pedigree. The points of well-bred young bulls improve as they advance in years.

Choice of cows.—In judging of cows, I should

make some modification of the rules recommended for bulls. They should be always large, having capacious parts to support the calf to a large size, and to permit its egress freely at the period of calving. Purity of blood, of course, must be attended to as the first consideration; but, in order to obtain a well-bred large cow to breed from, I would overlook a point or two in the symmetry or quality. As in the case with bulls, small cows will generally show finest symmetry, yet I would deviate a little on the score of points, which are everything to a bull, to obtain a large capacious cow, which generally carries a strong healthy calf.

Milking Properties.—It has been frequently asserted that short-horned cows are bad milkers; indeed, that no kind of cattle are so deficient in milk. Those who say so do not know the still greater deficiencies of the Herefords, a species of cattle quite unknown in Scotland. The highest bred stocks of the Messrs. Collins, Mr. Mason, and Mr. Robertson, yielded little milk. Indeed, Mr. Robertson's could not supply milk sufficient for their own calves, at least not in the quantity which it was desired by him they should receive. Cows were kept for the purpose of supplying the deficiency of milk of the high-bred cows. But this deficiency of milk did not altogether proceed from the circumstance of the cows being of the short-horned breed; because those eminent breeders devoted their whole attention to the development of flesh, and not at all to the development of milk. Had the flesh been neglected as much as the milk, and the property of giving milk as much cherished as the development of flesh, their short-horned cows would have been deep milkers. As it is, the generality of short-horned cows are not bad milkers. Indeed, it is not to be doubted that where the general secreting powers of the animal system have been increased as it has been in that of the short-horns, the power of se-

creting milk will be increased with the power of secreting flesh and fat; all that seems requisite is to encourage the power of that secretion which for the time is most wanted. I have no doubt that it is completely in the power of the breeders of short-horns to make them good milkers. It would be to desire an impossibility, to desire the full development of flesh, fat, and milk at the same time; but there is no absurdity in desiring a large secretion of flesh and fat at one time, and a large secretion of milk at another, from the same cow. Accordingly, this is the very character which has been acquired by short-horn cows. They will yield from six to sixteen quarts a day throughout the season; and they are so constant milkers that they seldom remain dry above six weeks or two months before the time of calving.

But the practice of the owners of public dairies in towns, were there no other proof, would prove the milking powers of short-horn cows. They prefer them as the greatest and most steady milkers; and it is now difficult to see cows of any breeds but short-horns or crosses with them in these dairies. In London, Edinburgh, and Liverpool, fine short-horn cows may be seen at the public dairies. They are brought by the milkmen whenever they come of age, that is, about five or six years old. They give milk till they attain the age of eight or nine, and are then fed off fat for the butcher. These cows *can* be fed off fat. This property, and that of milking, prove clearly that short-horns possess both in a remarkable degree. They do not, it is true, possess both in an eminent degree at the *same time;* but they exhibit either property separately when it is desired. They thus give a return in flesh for part of their original high price, while they remunerate their owners in the mean time with an abundance of milk for their food.—*Edinburgh Quarterly Journal of Agriculture.*

CHAPTER II.

Improving the Breeds of Animals.

By improving of a breed is to be understood the producing such an alteration in shape or description as shall render the animal better fitted for the labours he has to perform; better fitted for becoming fat, or for producing milk, wool, eggs, feathers, or particular qualities of these. The fundamental principle of this amelioration is the proper selection of parents. Two theories have obtained notice on this subject, the one in favour of breeding from individuals of the same parentage, called the *in-and-in* system, and the other in favour of breeding from individuals of two different offsprings, called the system of *cross-breeding*.

That the breed of animals is improved by the largest males, is a very general opinion; but this opinion is the reverse of the truth, and has done considerable mischief. The great object of breeding, by whatever mode, is the improvement of form, and experience has proved that crossing has only improved, in an eminent degree, in those instances in which the females were larger than the usual proportion of females to males, and that it has generally failed where the males were disproportionably large.—(*Cully's Introduction, &c.*) The following epitome of the science of breeding is by the late eminent surgeon, Henry Cline, who practised it extensively on his own farm at Southgate.

The *lungs* are of the first importance. It is on their size and soundness that the strength and health of animals principally depends. The power of converting food into nourishment is in proportion to

their size. An animal of large lungs is capable of converting a given quantity of food into more nourishment than one with smaller lungs; and, therefore, has a greater aptitude to fatten.

The *chest*, according to its external form and size, indicates the size of the lungs. The form of the chest should approach the figure of a cone, having its apex situated between the shoulders and its base towards the loins. Its capacity depends on its form more than on the extent of its circumference; for where the chest is equal in two animals, one may have much larger lungs than the other. A circle contains more than an ellipsis of equal circumference; and in proportion as the ellipsis deviates from the circle, it contains less. A deep chest, therefore, is not capacious, unless it is proportionally round.

The *pelvis* is the cavity formed by the junction of the haunch bones with the bone of the rump. It is essential that the cavity should be large in the female, that she may be enabled to bring forth her young with less difficulty. Where the cavity is small, the life of the mother and her offspring are endangered. The size of the pelvis is chiefly indicated by the width of the hips and the breadth of the waist, which is the space between the thighs. The breadth of the loins is always in proportion to that of the chest and pelvis.

The *head* should be small, by which the birth is facilitated. Its smallness affords other advantages, and generally indicates that the animal is of a good breed. Horns are useless to domestic animals, and they are often the cause of accidents. It is not difficult to breed animals without horns. The breeders of horned cattle and horned sheep sustain a loss more sensible than they conceive; for it is not the horns alone, but also much bone in the sculls of such animals to support the horns, for which the butcher pays nothing; and, besides this, there is an

additional quantity of ligament and muscle in the neck, which is of small value. The scull of a ram, with horns, weighed five-times more than a scull which was hornless. Both these sculls were taken from sheep of the same age, each being four years old. The great difference in weight depended chiefly on the horns, for the lower jaws were nearly equal; one weighing seven ounces, and the other six ounces and three quarters, which proves that the natural size of the head was the same in both, independent of the horns and the thickness of the bones which support them. In horned animals the scull is extremely thick. In a hornless animal it is much thinner, especially in that part where the horns usually grow. To those who have reflected on the subject it may appear of little consequence whether sheep and cattle have horns; but, on a moderate calculation, it will be found that the loss in farming stock, and also in the diminution of animal food, is very considerable from the production of horns and their appendages. A mode of breeding which should prevent the production of these would afford a considerable profit in an increase of meat, wool, and other valuable parts.

The length of the neck should be proportioned to the height of the animal, that it may collect its food with ease.

The muscles, and the tendons, which are their appendages, should be large, by which an animal is enabled to travel with greater facility.

The bones, when large, are commonly considered an indication of strength; but strength does not depend on the size of the bones, but on that of the muscles. Many animals with large bones are weak, their muscles being small. Animals that have been imperfectly nourished during their growth have their bones disproportionately large. If such deficiency of nourishment originated from a constitutional defect, which is the most frequent cause, they

remain weak during life. Large bones, therefore, generally indicate an imperfection in the organs of nutrition.

To obtain the most approved form, the two modes of breeding described, as the in-and-in and crossing modes, have been practised. The first mode may be the better practice when a particular variety approaches perfection in form, especially with those who may not be acquainted with the principles on which improvement depends. When the male is much larger than the female, the offspring is generally of an imperfect form. If the female be proportionably larger than the male, the offspring is of an improved form. For instance, if a well-formed large ram be put to ewes proportionately smaller, the lambs will not be so well shaped as their parents; but if a small ram be put to large ewes, the lambs will be of an improved form. The proper method of improving the form of animals consists in selecting a well-formed female proportionately larger than the male. The improvement depends on this principle, that the power of the female to supply the offspring with nourishment is in proportion to her size, and to the power of nourishing herself from the excellence of her constitution.

The character of animals, or the external appearance by which the varieties of the same species are distinguished, are observed in the offspring; but those of the male parent more frequently predominate. Thus, in the breeding of horned animals, there are many varieties of sheep, and some of cattle, which are hornless. If a hornless ram be put to horned ewes, almost all the lambs will be hornless, partaking of the character of the male more than of the female parent. An offspring without horns, or rarely producing horns, might be obtained from the Devonshire cattle, by crossing with bulls of the Galloway breed, which would often improve the form of the chest, in which the Devonshire cattle are often deficient.

Examples of the good effects of crossing may be found in the improved breeds of horses and swine in England. The great improvement in the breed of horses arose from the crossing with the diminutive stallions, Barbs and Arabians; and the introduction of Flanders mares into the country was the source of improvement in the breed of cart-horses. The form of swine has been greatly improved by crossing with the small Chinese boar.

Examples of the bad effects of crossing a breed are more numerous. When it became the fashion in London to drive large bay horses, the farmers in Yorkshire put their stallions to much larger mares than usual, and thus did infinite mischief to their breed, by producing a race of small-chested, long-legged, large-boned, worthless animals. A similar project was adopted in Normandy, to enlarge the breed of horses there, by the use of stallions from Holstein; and, in consequence, the best breed of horses in France would have been spoiled had not the farmers discovered their mistake in time, by observing the offspring much inferior in form to that of their native stallions. Some graziers in the isle of Sheppey conceived that they could improve their sheep by large Lincolnshire rams; the produce of which, however, was much inferior in the shape of the carcass and the quantity of the wool, and the flocks were greatly impaired by this attempt to improve them. Attempts to improve the animals of a country by any plan of crossing, should be made with the greatest caution; for by mistaken practice, extensively pursued, irreparable mischiefs may be done. In any country where a particular race of animals has continued for centuries, it may be presumed that their constitution is adapted to the food and climate.

It may be proper to improve the form of a native race, but, at the same time, it may be very injudicious to attempt to change their size; for the size of ani-

mals is commonly adapted to the soil and climate which they inhabit. Where produce is nutritive and abundant, the animals are large, having grown proportionally to the quantity of food which, for generations, they have been accustomed to obtain. Where the produce is scanty, the animals are small, being proportioned to the quantity of food which they were able to procure. Of these contrasts, the sheep of Lincolnshire and Wales are samples. The sheep of Lincolnshire would starve on the mountains of Wales.

Crossing the breeds of animals may be attended with bad effects in various ways, and that even when adopted in the beginning on a good principle; for instance, suppose some larger ewes than those of the native breed were taken to the mountains of Wales, and put to the rams of that country; if these foreign ewes were fed in proportion to their size, their lambs would be of an improved form, and larger in size than the native animals; but the males produced by cross, though of a good form, would be disproportionate in size to the native ewes; and therefore, if permitted to mix with them, would be productive of a starveling, ill-formed progeny. Thus a cross, which at first was an improvement, would, by giving occasion to a contrary cross, ultimately prejudice the breed. The general mistake in crossing has arisen from an attempt to increase the size of a native race of animals; being a fruitless effort to encounter the laws of nature.

From theory, from practice, and from extensive observation, the last more to be depended on than either, "it is reasonable," Cline continues, "to form this *conclusion:* it is wrong to enlarge a native breed of animals; for, in proportion to their increase of size, they become worse in form, less hardy, and more liable to disease."—*Communications to the Board of Agriculture.*

CHAPTER III.

Management and Fattening of Cattle.

Notes on the Management of Cattle.—As soon as the ploughman has unyoked his oxen, let him rub them, and press their backs strongly with his hands, pulling their hide, and not suffering it to adhere close to their flesh, for such adhesion constitutes a very injurious disease. Let him rub their necks thoroughly. The oxen are not to be tied to their cribs until they cease to perspire and pant: nor is it proper to give them much food, even when it shall be due time to feed them; but their allowance should be dispensed in small quantities at a time, which having finished, they may be led forth to water, and enticed to drink *by whistling;* immediately afterward, they must be satisfied with a large allowance of fodder.

The temper and disposition of cattle are most approved which approach the mild and gentle rather than the violent and fierce, still without a sluggish heaviness; dismayed at loud and blustering words, yet with such a confidence in their own strength as not to be startled at common objects of sight or hearing, or afraid to ford rivers or pass bridges: which are great feeders, but slow in mastication; for these digest better than such as devour their food greedily and with haste, preserving their condition and bodily strength. But it would be an equal fault in one who uses labouring oxen, to make them fat as to keep them lean; for their condition of body ought to be moderate and fit for business, robust and full in the muscles, but not loaded with fat, whence they would be jaded and wearied by their own weight.—*Columella.*

The stronger and richer the land is, the more must cattle be kept up to a good pitch; for if on such land cattle are in the winter suffered to run to poverty or are brought into it poor, they will be liable to the yellows or the blain, and most sorts of distempers; for it is the same as if you should offer strong meats to weak stomachs.

Clover intended to be kept the second year for feed, ought not to be grazed the first year by sheep, which bite so close as to wound the crown of the roots. [The same of other artificial grasses.] The leaves and stalks of artificial grasses being full of juices, cattle fed upon them, even in the driest summers, scarcely need water. Sheep fed on clover will dung quite moist; whereas their excrement, when fed on natural grass, will generally be hard and dry. (A double advantage in the artificial grasses; during seasons of great drought, neither the grass nor the cattle will feel the common want of water.) [Cattle fed in winter upon ruta baga do not require and should not receive any water.]

A young beast may eat well HALF FAT; but an old cow half fat is not eatable, for the whole body of such a cow ought to be filled with new juices. A young cow will be fat on the back, but very rarely well tallowed within; whereas an old cow seldom handles so well, but generally carries most of her fat within. A two-year old ewe will fatten and tallow well. The springing or standing out of the navel is the best sign of internal fat; also, in lean cattle, such protuberance is a sign that they will fatten internally.—*Lisle.*

Comparative value of Roots for fattening farm-stock.—The Agricultural Society of Scotland awarded to Andrew Howden, in 1832, a premium for a report of experiments on the comparative advantages of feeding stock with mangel wurzel, turnips, and potatoes. We abstract the result of the experiment for the Cultivator from the Prize Essays of the Society.

Mr. Howden, with a view to the experiment, set apart the products of two acres of mangel wurzel, amounting to fifty tuns, five acres of Swedish turnips, being 140 tuns, and two acres of potatoes, weighing 29 tuns 4 cwt. The experiment was made with 21 head of cattle, which received, in addition to the roots, a few distiller's grains and a little straw. The following table shows the roots appropriated to each lot, and their monthly increase in girth.

	Lot No. 1, from one acre of potatoes, one acre of mangel wurzel, one acre of Swedish turnips.	Lot No. 2, from one acre potatoes, two acres Swedish turnips.	Lot No. 3, from one acre mangel wurzel, two acres Swedish turnips.
1831, Nov. 30,	35 ft. 8 inches,	35 ft. 9 inches,	35 ft. 8 inches,
Dec. 30,	36 " 6 "	36 " 7 "	36 " 6 "
1832, Jan. 30,	38 " 2 "	38 " 4 "	38 " 2 "
March 1,	39 " 7 "	39 " 8 "	39 " 6 "
" 30,	40 " 8 "	40 " 10 "	40 " 6 "
April 30,	41 " 4 "	41 " 7 "	41 " 3 "

Twenty-eight tuns of Swedish turnips and mangel wurzel withdrawn and fed to other stock.

On the 30th of January, Mr. Howden took a pair of cattle out of each lot, and fed No. 1 with potatoes and water, No. 2 he fed with Swedish turnips, and No. 3 with mangel wurzel. The following shows their relative increase in girth in three months.

	Lot No 1. Potatoes.	Lot No. 2. Swedish turnips.	Lot No 3. Mangel wurzel.
1832, Jan. 30,	10 ft. 8 inches,	10 ft. 5 inches,	10 ft. 4 inches
April 30,	11 " 6 "	11 " 3 "	11 " 2 "

When the cattle were sold, the purchasers agreed that the lot fed on Swedish turnips were from 7 to 10*s.* a head better than the other lots. The average advance upon the original value of each was £6 12*s.*; and the cost of grain being deducted, there remained £120 ($532 80) in return for the eight acres produce consumed. This is no bad evidence of the profits of root culture in the fattening of cattle; and we hope it will help to extend this culture among us.

CHAPTER IV.

Sheep Husbandry.

The rapid increase of woollen manufactories among us for the last fifteen years, and the corresponding increase of our flocks, renders it obvious that sheep husbandry has already become an important branch of our farming, and a source of individual and public wealth. And when we consider that neither our woollens nor our wool are equal to the home consumption; that both are already becoming articles of export, and that wool is now profitably grown upon our most valuable farms, we have good reasons to believe that the time is not distant when wool will become one of the prime staples of the north, as cotton has, within a few years, of the south. Impressed with this belief, the conductors feel desirous of rendering the Cultivator a useful vehicle of information upon this important branch of our industry; and, while they earnestly solicit communications upon this subject from practical husbandmen, they promise to contribute such information as their observation or reading may suggest as valuable. With this view they have collected some facts, from high authorities, for this number, which will be found under the head of *Sheep Husbandry.*

There is little doubt but that the mountainous and hilly districts of our state, at present of comparatively little value, will ultimately become our most profitable sheep-grounds. They will afford a more healthy range for these animals than flat rich lands, and sheep will be maintained with far less expense upon them than upon the latter. Sheep

delight in pure free air and dry pasture, and are constitutionally fitted for rocky and stony situations; and indeed it is contended by some, and with much reason, in our opinion, that stony grounds are important to their health; that on stony, dry soils, they are not subject to the foot-rot and other distempers, which are known often sorely to afflict them when kept on moist, soft pastures. Many of the farmers in England pave the yards in which sheep are folded. If these animals can be profitably maintained upon farms worth from fifty to one hundred dollars per acre, they can be maintained with greater profit upon hilly lands costing from two to twenty dollars per acre; for certainly the difference in the herbage of the two descriptions of land will bear no proportion to the difference in price. Of all products of the farm, wool will best bear the expense of long transportation to market. When on a late visit to a friend in Massachusetts, we were told by an intelligent resident, that fifteen years ago most of the farmers of the town were deeply in debt, and their farms going to ruin; but that sheep husbandry, to which all but two or three had since turned their attention, had given an entire new aspect to their affairs; and that he would then engage to pay every debt owing by the inhabitants of the town for the surplus produce of that season. It seems to be well established that the soil, as well as the owner of a sheep-farm, become enriched by the flock.

As particularly applicable to the season, we recommend to all who stand in need of our advice, that they keep their sheep dry, give them pure air and plenty of food, and carry them to spring grass, by all means, in good flesh. Ten well-kept sheep are more profitable than thirteen badly kept. To protect them from storms in winter, you should have a covered shelter for them to resort to at night. To ensure them pure air, this shelter should

not be habitually, if at any time, wholly closed at the sides. To keep them dry, they should have a liberal supply of straw litter, and this often repeated. This will also become a matter of economy in regard to manure, as the straw will absorb and prevent the loss of the urine, which is a moiety of the manure. To keep them in good health and good plight, feed them well, stint them not in salt; and feed turnips, potatoes, or coarse grain occasionally, particularly to such as have to give suck. If you have not the roots, by all means provide them another year; for rely upon it, there is no more profitable winter, or, rather, spring food for sheep, than Swedish turnips; they are wholesome, nourishing, and tend greatly to enrich and increase the milk of the ewes. Green food is, besides, highly valuable for all farm-stock in the spring of the year.

Hints on Sheep Husbandry.—In an agricultural view simply, the importance of sheep is extreme; since, by their assistance alone, thin, barren, upland soil, so often the far greater part of a country, can be cultivated to advantage, which otherwise could not, generally, be cultivated at all. The sheep will subsist and multiply on those barren soils where no other animal would be maintained with equal profit; he is equally calculated for the most deep and fertile, challenging competition, and dividing the palm of profit with the ox; and is excluded from such only as abound in stagnant water, the moist exhalations of which are naturally destructive to his constitution.

The bodily constitution of the sheep, as of the goat, the deer, the camel, the hare, and the rabbit, is usually called hot and dry; we, however, know from unquestionable experience, that dry soils, a dry air, dry provender, and green food, which does not abound in cold and watery juices, are most appropriate and salutary to them. Indeed, the contraries are replete with danger to the sheep most particu-

larly, which is naturally and constitutionally subject to serous effusion, producing a dropsy of peculiar kind, either universal or circumscribed, but more usually the latter, extending indifferently to all parts of the body. This efflux of water, or, rather, watery tendency, in all the fluids of the body, gradually produces in the solids disorganization, mortification, or rot. Catarrhal affections are the most usual primary causes of rot. These ideas very plainly indicate the proper situations, food, and treatment of sheep.

Sheep have often been described as of "a weakly constitution, liable to be exhausted by fatigue, and ill able to bear the extremes of heat and cold; subject to many diseases, most of which are contagious." Such notions are to be received with much allowance; for in truth this useful race seems enabled by nature to accommodate itself to all the vicissitudes of climate, and to nearly the extremes of heat and cold, of which the husbandry, ancient and modern, of both northern and southern countries, forms the best proof. We see them accustomed to brave the most rigorous of these extremes unhurt, liable, as might be expected from the nature of the case, to casualty and loss, which timely shelter might prevent. The sheep well fed, from its fleecy covering and gregarious habits, whence results an atmosphere of considerable warmth, remains very little affected by intense cold, if unaccompanied by moisture; he is, perhaps, more unfavourably affected by great heat, but continues safe under either extreme, with the advantage of sufficient shelter, obviously one of the most important points in the sheep husbandry. The various diseases incident to sheep have their origin, almost exclusively, in neglect, improper situations and treatment, or errors in feeding. Reverse these, and diseases among sheep would be as few and rare as they are now numerous and rife throughout

our sheep districts; another grand point in their husbandry.—*Lawrence on Cattle.*

One of the two species of sheep, the long and the short-wooled, having been chosen as most appropriate to the situation, and wool being made an object, it is most advantageous to select such flocks as are pure as possible of the species to which they belong, and not a mixture of the short and long wooled breeds, which must generally produce an inferior fleece, disadvantageous to the manufacturer. Length of staple in the long, and fineness, elasticity, and closeness in the short wooled fleece, will be the best guides in this case.

Whether the wool be long or short, the carcass of the animal ought to be amply and regularly covered; it is a great defect when the belly is bare, and a still greater when the wool is thin and open along the ridge of the back, admitting rain and moisture to a most susceptible part; indeed, to descend upon all parts of the body.

It is a piece of good old advice, to buy your *rams* a little before shearing time, if possible; and a very necessary modern addition, to take the opportunity of purchasing at the farmer's house, while you can see the animal in *paribus naturalibus*, and before he has been decked out and trimmed for show by the sheep-barber. A thick fleece, covering all parts with as much equality as possible, containing plenty of *yolk*, or retained or inspissated perspiration, is the object. If ewes equally well-bred can be procured, the shepherd anticipates and reaps an immediate benefit; if not, he must patiently await improvement of his wool through the medium of the superior blood of his rams.

At *shearing time* examine the bottoms of the fleece, or the lower extremity of the filaments of wool; if it be *stichy-haired*, of mixed quality, or if the sheep have a coarse breech, or be not well covered, it must be rejected as improper for a breed-

ing stock, where it would perpetuate its defects. The quantity of yolk or grease is a good proof of the thickness of the fleece, since by the closeness and thickness of the wool the grease or perspirable matter of the animal is retained; hence fine, closed, curled wool has ever the greatest quantity of yolk. —*Bath papers.*

Dentition is commenced and is completed early with the lamb, and I have within these few hours examined the mouth of one three months old, which has its complement, eight small or lambs' teeth. Two of these, in front, fall, and are replaced by two broad or sheep's teeth, at some period previous to the sixteenth month; sometimes, although rarely, within the first year. A similar renewal of two teeth takes place every succeeding year, until towards the end of the third; sometimes during the fourth, or in the commencement of the fifth year, when the sheep is full-mouthed or aged, having acquired the eight broad teeth.—*Lawrence.*

Markham advises to "choose your sheep the *biggest-boned*, with the best wool, the staple being soft, greasy, and well-curled, and close together, so that a man shall have much ado to part it with his fingers. These sheep, besides bearing the best burden, *are always the best butcher's ware, and go soonest away in the market.* The *ram* large of body in every general part, with a long body and a large belly, his forehead broad, round, and well rising, a cheerful, large eye, straight, short nostrils, and a very small muzzle, by no means any horns, for the dodder [hornless sheep] is the best breeder, and his issue never dangereth the dam in yeaning as the horned sheep do. A large upright neck, somewhat bending like the neck of a horse; a very broad back, round buttocks, a thick tail, and short, jointed legs, *small, clean, and nimble:* his wool should be thick and deep, covering his belly all over; also his face, and even to his nostrils, and so downward to his very knees and thighs."

Cully's description of the Ram.—"His head should be fine and small, his nostrils wide and expanded, his eyes prominent, and rather bold and daring, ears thin, his collar full from his breast and shoulders, but tapering gradually all the way to where the head and neck join, which should be very fine and graceful, being perfectly free from any coarse leather hanging down; the shoulders broad and full, which must, at the same time, join so easy to the collar forward and chine backward as to leave not the least hollow in either place; the mutton upon his forearm or forethigh must come quite to the knee; his legs upright, with a clean, fine bone, being equally clear from superfluous skin and coarse, hairy wool, from the knee and hough downward; the breast broad and well forward, which will keep his forelegs at a proper wideness; his girth or chest full and deep, and, instead of a hollow behind the shoulders, that part by some called the foreflank should be quite full; the back and loins broad, flat, and straight, from which the ribs must rise with a fine circular arch; his belly straight, the quarters long and full, with the mutton quite down to the hough, which should stand neither in nor out; his twist [the junction of the inside of the thighs] deep, wide, and full, which, with the broad breast, will keep his forelegs open and upright; the whole body covered with a thin pelt, and that with fine, bright, soft wool."

Marks of excellence in long or short-wooled sheep.—Fleece white (tinged with a red-brown hue, if Merino) palate, with the bridge of the nose, horns, and hoofs white. No cat's hairs. The horns wide-set, otherwise the head liable to the danger of contraction. Yet white-headed horned lambs are dangerous to the ewes in yeaning. It is said the horns may with safety be twisted off when the lamb is only a month old.—*Lawrence.*

South Downs.—The number of ribs in a sheep is

thirteen. Average weight of tallow from 12 to 16 pounds, exclusive of kidney fat. The finest-wooled fat are fit for market six weeks or two months sooner than the coarsest; and in proportion to the fineness of the wool they succeed each other. The grain of the flesh is in proportion to the fineness of the wool, and the carcass of a fine-wooled sheep will considerably outweigh that of a coarser-wooled sheep of equal size and dimensions. If well kept, the ewes will produce more than one lamb, instances not being wanting of the production of five at a birth; but in such cases more than two of them are seldom saved. The coarsest-wooled ewes bring lambs with the greatest quantity of wool upon them at the fall.—*Mr. Alfrey, in the Annals of Agriculture.*

The signs of health in sheep are, first, a skittish briskness, clear azure eye, florid, ruddy eyestrings and gums, teeth fast, nose and eyes dry, respiration free and regular, feet cool, dung substantial, wool fast and unbroken, skin of a fine florid red, particularly on the brisket. Sheep are often seen in market with nose and eyes running, or, as we should say of a horse, almost glandered. This happens from wet layers during their travel in cold, windy seasons; and a continuance of such weather, and, perhaps, after-neglect, lay the foundation of diseases which, afterward, the cause is not suspected. Great caution is necessary during drift [driving], that the flock be not suffered to rest on wet and boggy layers, and that they are provided with dry lodging and sufficient keep to support their strength.—*Lawrence.*

Folding Sheep.—The advantages supposed to be derived from it are visionary; being, in fact, no more than robbing a large part of a farm to enrich a small one. Large flocks, even any number, kept together above one hundred, is a barbarous practice; for in such flocks the strongest will beat the

rest from their food; instead of which, the weakest sheep should have the best food; and, if folding is necessary on farms that have no commons annexed to them, why not have small folds on different parts of the farm, and for those of different kinds, ages, or strength, and thereby save the trouble of driving from one part of the farm to another? for had not the animal, after it has filled its belly, better lie down and sleep than travel to create an appetite? From my general observation in various parts of the kingdom where folding is and is not practised, my opinion has been confirmed; nor will I allow any utility to the fold, excepting, perhaps, in the case of a flock feeding on a large open commons by day, and considered in the light of mere dung-carriers to the arable land.—*Bakewell.*

Covered Folds.—In Essex it is common for the farmers to fold their sheep in covered folds, and mix their dung with ditch-earth, mud, &c., which causes the dung to spread and go much farther. In Gloucestershire, &c., the farmers house their sheep at night, and litter them with straw; and, when one quantity is converted into soil, they add fresh, so that a whole winter affords a great quantity of dung where a large flock is kept; and it is found, by long experience, to answer the trouble; so that, by folding in summer and housing in winter, all their dung and urine are preserved for the land in tillage.—*Mordant.*

It seems to be admitted on all hands, that if sheep are yarded they should be supplied with dry litter, both because it is essential to their health, and that this litter absorbs and saves the urine essential to the increase of manure; and it is no less essential that the location of the sheep-pen should be a dry one. A free circulation of air, though cold, is not so prejudicial to sheep, if they are protected from wet by a sufficient covering.

Canaan Centre, Feb. 14, 1835.

I have long believed that the principal cause of any great mortality among sheep arose from want of sufficient feed and proper care. It is undoubtedly very wrong to let sheep ramble over the fields after the nutriment of the grass on which they feed is materially injured by severe frosts. Sheds for the shelter of sheep in winter are all important, as exposure to storms is very injurious to them, and I am of opinion shelters built on the highest part of our pastures for flocks to flee to, in severe storms in summer, would be of great service, as they undoubtedly frequently contract diseases from exposure to long and cold rains from which they never recover. During such exposure they contract violent colds, which finally become permanently seated on their lungs, and is, in my opinion, the cause of the loss of many sheep. This may be evident to all observing persons (as they will notice that sheep, after such rains, are many of them troubled with the snuffles), and shows the necessity of being very particular to house them during cold nights and storms immediately after shearing; the contrast being so great after losing their clothing, that a trifling exposure may prove fatal; and this precaution is more necessary with fine flocks than with coarse, as they are naturally more delicate and less able to endure great changes. Water I also consider very important for sheep in winter, and, when it is practicable, should be brought into their yards, so as to be convenient to them at all times. I have four flocks that drink at one trough, and I observe that, when they are feeding at the racks, the water-trough will be thronged with sheep: some of them constantly leaving their hay for water, which satisfies me that convenient access to water adds to their comfort, and, consequently, to the improvement of their condition.

The above remarks, if you think them worth it, you are at liberty to publish; but my principal object in this communication is to give to the public the result of my experience in rearing lambs, and which, I am sensible, will be lost to all those that neglect their flocks, and to most of those that do not attend to them personally, as care and prompt attention to all their wants is the great secret. To ensure the life and health of every lamb, bearing ewes should all be in good condition; then lambs are as likely to live as the young of other animals; but, if the ewes are feeble, they will have no milk to support their lambs, if they should chance to be strong and healthy. Feeble sheep are often exhausted in bringing forth their young, and, consequently, will take no notice of them; and strong as well as feeble ones sometimes need help at such times, which should be done with great caution. They should never be helped except when their pains are on, and when they are trying to help themselves; and the lamb should not be taken entirely away, but left so that the sheep will have to make a little exertion after she is left; otherwise, if the sheep is at all wild, she will, from fear of the person helping her, make her escape, and take no notice of her lamb. I am in the habit of helping every sheep in that situation which I can come at, as it undoubtedly saves them much pain and exertion. Sheep should invariably be housed nights and stormy weather during the time of dropping lambs, and I have been in the habit of housing mine nights till I wash them, to secure them from the ravages of the foxes. Sheep should have all the facilities for procuring fresh grass that is possible to give them, before and after the time of dropping their lambs, which adds greatly to the quantity as well as quality of their milk; but turning them out on the fields, without close attention, is often the cause of losing lambs; as, when they are dropped on the

cold ground, they often become chilled, so as to be unable to get up, and in a short time will be past recovery. When I have neglected mine in that way, and found one that has any life left, I take it immediately to a warm room, and put all but its head into a pail of warm water, and then rub it with a dry cloth till it begins to struggle for life; and I have never failed of restoring such lambs to the use of their limbs, though I have found them so far gone as to be unable, for some time, to observe any expansion of the lungs; with their limbs perfectly stiff, and their jaws almost immoveably fixed. With such attention, you may have them running about in an hour, and to all appearance as strong as if nothing had happened to them, though they require a warmer atmosphere for some time than if they had not been chilled. Care should be taken not to feed them with milk till they are sufficiently recovered, as there is danger of strangling them by the milk entering their lungs. I have had them injured in that way, which, though they lived, would be a long time recovering from the effects of such treatment. Lambs will live twenty-four hours, and even longer, without any nourishment, and should not, as a general rule, be fed till, by their actions, you discover they are seeking food, and then they will, in most cases, drink without much trouble. Many lambs that it becomes necessary to feed are lost for the want of sufficient food, through fear of over-feeding; but my experience teaches that they should have all they will drink, and I let their own appetites govern. I have often had lambs of twenty-four hours old drink a pint of milk at once, and, when they drink the most, feel the most assured of success in raising them. There will always, in a large flock, be some that will not get milk enough. I am in the habit of making all such ones drink that I can, by taking a basin of milk and giving them my thumb to suck, so as to have a full supply once

or twice a day, till the milk of the sheep increases by the growth of feed. The milk of such sheep as lose their lambs should not be lost, but kept for the support of those that have not a full supply. Such sheep I manage to make own the lambs of others, so that I often have lambs that draw their living from two sheep through the season. This I do when I find the dead lamb before it is dry, by rubbing it over the lamb I wish to make the sheep own, and in that way deceive her, and make her think it hers. Where that will not answer, I skin the dead one, and sew the skin on to the live one, which generally answers the desired end; but, in case of failure in both the above experiments, I tie up the sheep, and fetter her in a small pen with the lamb and the other sheep, and hold her for the lamb to suck several times in a day, till she will own it. As a proof of the truth of what I have asserted, that care and prompt attention are the great secret of success, I will relate my success last year, which I am far from attributing to any good luck I have over others, as I believe that prosperity or adversity in all such cases is the result of good or bad management, of care or neglect. Of one hundred and thirty-one lambs I had dropped last spring, I raised one hundred and twenty-six.

A few words as to future management, and I have done. Lambs should always be left at home when sheep are to be washed, as they are saved much fatigue where the distance is considerable, and many accidents incident to a pen, crowded as they are at such times, besides the advantage of having the sheep go directly home without any trouble after washing. Ticks are very injurious to sheep of all ages, but more so to lambs, as they have the trouble of them in summer, the ticks leaving the old ones for a more secure retreat on the lambs. To destroy ticks, I take 10 or 12 lbs. of tobacco-stalks for one hundred lambs (which I buy of the tobacconist for as

many pence), and at the time I shear sheep, put it into a tub sufficiently large to dip them in, and fill it with water, and let it soak six or eight days, when I get up my lambs, mark, dock, and alter them, then dip them into the tobacco-juice; this not only kills the ticks, but is serviceable to the wounds made by docking and altering, and is all the remedy I ever apply to such wounds. Dipping the lambs in that way two successive years will destroy all the ticks in the flock.

The method of docking lambs by taking hold of the tail and cutting it off while the animal is struggling to escape, is very cruel, as it leaves the bone longer than the skin, which not only makes it very sore, but induces the flies to work at it, which endangers the life of the lamb. My method is, to have a man take up the lamb, and place the tail bottom upward on the square edge of a block; then, with a large knife, I crowd the skin which is loose up to the body, and strike the knife with a hammer, which leaves the skin longer than the bone, and, consequently it closes together over the bone, and the wound heals in a short time. I alter lambs by cutting the pouch off close to the body, which leaves nothing to impede the shears more than cording, and is attended with less trouble. Lambs that have much wool on them should be sheared about the pouch, to prevent the blood and wool from becoming so hard as to obstruct the discharge of matter from the wound. Lambs should be weaned the last of August, and have a good chance for feed till November; then oats in the bundle two or three months, as their condition may require.—D. S. Curtis.

Diseases of Sheep.—The diseases of these valuable creatures are sometimes of a very formidable nature, and baffle all the means of remedy which are known to us. Of these diseases the most dreaded is *rot*, which often extends over whole districts of country.

It is known that this disease is favoured or produced by a humid state of the soil and atmosphere. It is in wet seasons that it prevails the most and is the most fatal. By draining land the tendency to it is lessened or taken away. Often sheep are rotted by pasturing on the wet parts of the farm, whereas, if kept from these parts, they remain free from disease. Nay, a single sheep that has a disposition to pick up its food in moist places will die, while the others will not be affected.

The animal affected does not all at once show symptoms of disease; for sometimes it remains a considerable time in apparent health, and, long after it has been removed from the place of infection, droops and dies. Sheep are every year purchased in seeming health, and yet, after a time, they are found to be affected. A moist and even luxuriant autumn is dreaded above all things by the owner of sheep; for the seeds of infection are then often spread, to appear in the following spring, or after the lapse of a longer period.

The signs of rottenness in sheep are familiar to all shepherds. The animal becomes emaciated; its eye becomes dull and glassy; a black purging generally takes place; the wool, on being pulled, comes readily away from the skin; the breath becomes fetid, and the urine is small in quantity and high coloured. As the disease proceeds, the skin is marked with spots, and the emaciation increases continually, until the sheep dies. In short, the term rot expresses truly the state of the animal. The disease proceeds with various degrees of rapidity; sometimes it attacks the entire flock suddenly, and sometimes its progress is gradual, and it affects only a given number of individuals. Graziers often avail themselves of the period of the animals beginning to decline to rid themselves of an infected stock. During the first period of being tainted the sheep have frequently a strong tendency to feed,

and, if killed in time, the flesh may not be perceptibly affected.

In all cases of rot, the disease is accompanied by a morbid state of the liver. During the process of it, the fluke, a small animal, *Fasciola hepatica*, appears on the parts connected with the liver and the gall-bladder. At first the number of these creatures is small, but as the disease advances they increase, and before death are generally very numerous. In the last stage of this disease they have extended to the stomach and other parts.

Frequently the disease terminates favourably, the inflammatory action going off without destroying the parts. But, even in this case, the taint is rarely removed, and years afterward, when the animal has been fattened and killed, the liver has been found to be diseased, the flukes being in great numbers.

The best preventive of rot is to render the soil dry; hence, on all sheep pastures, the importance of draining. But should the disease, in spite of all precautions, appear, then we should, without loss of time, remove the sheep to a drier pasture, and supply them liberally with proper food. It is only, however, in the early stages of the disease that a change of food will usually avail. If the disease has proceeded to a considerable extent, even though it should not have evinced itself by any great change in the external appearance of the flock, the animals will often perish hourly amid the most wholesome food with which they can be supplied.

Of all the medicines that have been proposed for this fatal disease, salt alone is that whose virtue has been established by any satisfactory testimony. The beneficial effect of salt in the prevention, and even cure, of rot, has been confirmed by the observation of farmers in this and other countries.

Salt indeed will not, in all cases, prevent or cure the disease; for sometimes the tendency to it from

particular causes is too strong to be counteracted, and, when it has once attacked the flock, too violent in its progress to be arrested. But, though salt is not a specific, it is the best means of remedy with which we are acquainted.

If salt be placed near the animals in troughs or on flat stones, they will eagerly lick it, and when disease threatens them it may be given to them in any quantity in which they will consume it; for it is then seen that they are obeying a natural instinct in having a recourse to the remedy; and in a wet season, when disease may be apprehended, no one should grudge the trouble of so cheap and simple a precaution.

Much has been written upon the subject of this disease, but all that has been written has nearly left us where we were with regard to the remedy. It has been long known that wetness of the soil, however produced, gave rise to rot; that the best preventive was pasturing on dry ground and giving sufficient food; and that the best remedy, where disease appeared, was a change of pasture. To these results of old experience is to be added the using of salt.

Besides the rot, properly so termed, sheep are subject to inflammatory putrid fevers, which occasionally seem to be epidemic; and these are sometimes termed rot. Another disease to which the term rot is applied is called the hunger-rot. This arises from the want of sufficient food, which produces an unhealthy state of the viscera, leanness, and death. In this disease the wool falls off, and hence it is sometimes called the pelt-rot.

Another disease, arising from a different cause than the rot, but, like it, ending in emaciation and the death of the animal, is provincially termed *pining*. This disease is accompanied by a costive state of the animal, whereas the rot is never accompanied by costiveness; and in the rot the liver

is always affected, while in the pining the liver is sound.

This disease seems to arise from the want of exercise, and from the animals feeding on very dry pastures. Before the extensive draining of the pasture-lands, where it is now found, the disease was unknown. The rot was then common; but with the draining of the lands the rot disappeared and this new disease took its place. The former practice of management in the districts where the disease now prevails, was to keep the sheep in flocks, which were moved about along their allotted range of pastures. They are now, under a more approved system of management, suffered to spread over a large extent of pasture; and thus they are not obliged to take exercise, but are allowed to feed more on a given spot of ground.

A change of place and food is the preventive or the remedy; and if a change of food is resorted to in time, it is generally sufficient to arrest the progress of the disease. Even a removal to a fresh heath will sometimes accomplish the purpose; but the proper and effectual remedy in all cases is a change to a more rich and succulent pasture. The disease is sometimes very fatal, destroying entire flocks like a pestilence.

The braxy is similar to some of the diseases mentioned in its violence and effects; but it arises from different causes, and affects the animal in a different manner. Under the general term braxy, several diseases, or, rather, varieties of the same disease, seem to be included. But in all cases, when the bodies are opened, they exhibit marks of inflammation.

The progress of this disease is so sudden and violent, that even if we possessed a remedy, it would generally be too late to apply it. Of the remedies employed, bleeding seems to be that which the nature of the disease points out. This disease seems generally to be caused by bad food, and the most

efficient preventive is known to be good feeding. Turnips or other succulent roots given to young sheep feeding on natural pastures are always beneficial; and it is to be observed, that in proportion as the treatment of sheep in a country has improved, this dangerous malady has diminished.

Diarrhœa and dysentery are likewise diseases of sheep. Diarrhœa is frequently produced by too sudden a growth of grass in spring, and it most frequently affects young sheep. It may be generally cured by removing the animals to drier pasture; and a little corn may be always given with good effects. Dysentery is a more serious disease, and is often very destructive. It is believed to be infectious, though upon very questionable grounds.

Sheep are liable to various cutaneous diseases. The principal of these is termed scab; and it is indicated by extreme itching and eruptions of the skin. When introduced into a flock, it may be attended with very serious effects, unless checked by efficient remedies.

The most common remedy for the disease is sulphur, mixed with some unctuous substance to fix it on the skin. One of the best recipes perhaps is a decoction of tobacco and spirits of turpentine, with the addition of a little softsoap and sulphur vivum. The decoction of tobacco may be obtained by boiling the tobacco in brine or salt water. The liquid, when prepared, is applied from a vessel like a teapot with a spout, or from a bottle with a quill passed through the cork. A person lays the wool back in lines so as to expose the skin, and pours out the liquid along the lines upon the skin. But when the distemper is very violent, a mercurial preparation may be required. This is now to be obtained in apothecaries' shops, under the name of sheep-ointment. It is made in balls, and, when used, it is dissolved in oil, and applied to the skin of the animal.

Sometimes infected sheep will find their way into

the best-managed flocks; but every care must be taken to keep the disease from breaking out, or to cure it as quickly as possible when it appears. The infection of a diseased flock is left behind it upon the hedges and pasture-fields, and, therefore, precaution is to be used before a fresh flock is turned into fields where infected sheep have been recently feeding.

Another disease of sheep is the foot-rot, which is an inflammation of the foot followed by an ulceration and destruction of the hoof. The disease chiefly prevails in wet seasons or in soft grounds. It is a very painful disease, causing the entire lameness and loss of condition of the animal. Certain grounds are noted for communicating the foot-rot; and as it appears among the pasturing-stock season after season, such grounds are commonly said to be infected with the foot-rot. The opinion that it is of a highly infectious nature is almost universal among farmers and shepherds. But however circumstances may seem to favour this opinion, it is more consistent with the effects observed to regard it as connected with the state of the pasture-grounds.

Although painful and destructive to the good condition of the animal, this disease is not absolutely fatal, except under entire neglect, in which case the animal becomes unable to seek his food, crawls upon his knees, and, worn away by exhaustion, perishes. But, if early attention be paid, the disease admits of remedy. In the first place, let all the infected part of the hoof be pared away, and the ulcerous matter removed, and then let the foot be washed with soap and hot water, and let the surface be dressed with some caustic, of which the best is muriate of antimony. In incipient cases, by simply paring the hoof and cleansing it with soap and water, and then dipping it in boiled tar, the progress of the disease will be arrested.

The next disease to be mentioned is of frequent occurrence. This is hydatids, staggers, or water in

the head, as it is frequently termed. The cause of this disease is in an animal, *Tænias globulus*, which finds its way into the brain, where it enlarges in size, and which, if not removed, ultimately destroys the animal. This creature resembles a round vesicle filled with water, and hence it was long supposed to be water, and the disease, in consequence, termed water in the head. The hydatids, though found chiefly in the brain of sheep, is found also in other parts of the body, as the liver and spleen.

When the hydatids is in the brain, the animal affected shows great symptoms of distress; he leans his head to one side, mopes by himself, continues turning round, and finally dies. The remedy for this disease is to reach the hydatids, and to extract it, or merely to perforate it in such a manner as to destroy its vitality. When it is situated at the surface of the brain, the part feels soft, and it is easy to reach it by a common awl or gimlet, or by a species of rude trepanning, which may be done by a common penknife. A little circular portion of the scull is to be cut, and raised up like a lid, a portion of the scull being left for this purpose. The hydatids being exposed, is to be pulled out by pincers, and the fluid absorbed by a sponge. The scull is then to be replaced, and dressed with common tar put upon a piece of soft leather.

When the hydatids is situated in the ventricle of the brain, it may be reached by a wire thrust up the nostrils. Some shepherds are very dexterous at this operation, and rarely fail in effecting a cure.

Sheep are liable to the attacks of various animals. One of these, a species of aphis, termed the sheep-louse, is very common, and chiefly prevails where the sheep are in an unhealthy condition. It is of a flat form, and, attaching itself to the throat and other parts, occasions much irritation. Tar, turpentine, or tobacco liquor are the substances chiefly used to

destroy this animal, and any simple mercurial preparation is effectual.

But the most pernicous enemy that attacks sheep is the common sheep-maggot, the larvæ of a species of flesh-fly. The fly having deposited her eggs on the skin of the sheep, the larvæ are hatched in great numbers, and grow with amazing quickness. They commonly appear about the root of the tail, or wherever filth has allowed the fly to attach her eggs, and thence they spread over the entire body, consuming the skin and eating into the flesh. The sheep, when attacked, manifest a strong sense of suffering. They frequently run with violence, until at length, overpowered and exhausted, they lie down and perish.

It is in the moist and warm season of the year that the sheep-maggot is chiefly produced. Constant vigilance is then demanded on the part of the shepherd, so that all foulness of the wool shall be clipped away; and the sheep must be daily inspected, lest this dangerous enemy establish itself. The maggot is effectually destroyed by a solution of corrosive sublimate, and in its early stages by less potent applications, as by urine and lime.

We must remember that the sheep, in his domesticated state, is yielded up to the care of man; his natural instincts are blunted, and he is unfitted to use those means of preservation which in his wild state he might possess. He is the prey of a multitude of enemies, against which he has no defence; and the more artificial his condition is, the more is he dependant on our care.—*Low's Elements of Practical Agriculture.*

CHAPTER V.

Construction and Management of Cattle-yards.

VEGETABLES, like animals, cannot thrive or subsist without food; and upon the quantity and quality of this depends the health and vigour of the vegetable, as well as of the animal. Both subsist upon animal and vegetable matter; both may be surfeited with excess; both may be injured by food not adapted to their habits, their appetites, or their digestive powers. A hog will receive no injury, but great benefit, from free access to a heap of corn or wheat, where a horse or cow will be apt to destroy themselves by excess. The goat will thrive upon the boughs and bark of trees, where the hog would starve. The powerful, robust maize will repay, in the increase of its grain, for a heavy dressing of strong dung; for which the more delicate wheat will requite you with very little but straw. The potato feeds ravenously, and grows luxuriantly, upon the coarsest litter; while many of the more tender exotics will thrive only on food upon which fermentation has exhausted its powers. But here the analogy stops: for while the food of the one is consumed in a sound, healthy, and generally solid state, the food of the other, before it becomes aliment, must undergo the process of putrefaction or decomposition, and be reduced to a liquid or æriform state.

I have gone into the analogy between animals and vegetables thus far, to impress upon the minds of our farmers the importance of saving, and of applying the food of their vegetables, with the same care and economy that they do the food of their

animals. How scrupulously careful is the good husbandman of the produce of his farm, destined to nourish and fatten his animals; and yet how often careless of the food which can alone nourish and mature his plants! While his fields are gleaned, and his grain, hay, and roots carefully housed and economically dispensed to his animals, the food of his vegetables is suffered to waste on every part of his farm. Stercoraries we have none. The urine of the stock, which constitutes a moiety of the manure of animals, is all lost. The slovenly and wasteful practice of feeding at stacks in the fields—where the sole of the grass is broken, the fodder wasted, and the dung of little effect—is still pursued. And, finally, the little manure which does accumulate in the yards is suffered to lay till it has lost full half of its fertilizing properties, or rotted the sills of the barn; when it is injudiciously applied, or the barn removed to get clear of the nuisance. Again, none but a slothful farmer will permit the flocks of his neighbours to rob his own of their food; yet he often sees, but with feeble efforts to prevent it, his plants smothered by pestiferous weeds, and plundered of the food which is essential to their health and vigour. A *weed consumes as much food as a useful plant.* This, to be sure, is the dark side of the picture; yet the original may be found in every town, and in almost every neighbourhood.

Is it surprising, that under such management our arable grounds should grow poor, and refuse to labour its accustomed reward? Can it be considered strange, that those who thus neglect to feed their plants should feel the evil of light purses as well as of light crops? Constant draining or evaporation, without returning anything, would, in time, exhaust the ocean of its waters. A constant cropping of the soil, without returning anything to it, will, in like manner, exhaust it of its vegetable food, and gradually induce sterility. Neither sand, clay,

lime, nor magnesia—which are the elements of all soils—nor any combination, or part, or all of them, is alone capable of producing healthy plants. It is the animal and vegetable matter accumulated upon its bosom, or which art deposites there—with the auxiliary aid of those materials diffused in the atmosphere—that enables the earth to teem with vegetable life, and yield its tribute to man and beast.

I will now suggest a cheap and practicable mode of *providing food for vegetables*, commensurate to the means of every farmer of ordinary enterprise; and, that my suggestions may not be deemed theoretical, I will add, that I "practise what I preach."

The cattle-yard should be located on the south side of, and adjoining the barn. Sheds, substantial stone walls, or close board fences, should be erected at least on the east and west sides, to shelter the cattle from cold winds and storms; the size proportioned to the stock to be kept in it. Excavate the centre in a concave form, placing the earth removed opon the edges or lowest sides, leaving the borders ten or twelve feet broad, and of a horizontal level, to feed the stock upon, and from two to five feet higher than the centre. This may be done with a plough and scraper, or shovel and handbarrow, after the ground is broken up with the plough. I used the former, and was employed a day and a half, with two hands and a team, in fitting two to my mind. When the soil is not sufficiently compact to hold water, the bottom should be bedded with six or eight inches of clay, well beat down, and covered with gravel or sand. This last labour is seldom required, except where the ground is very porous. My yards are constructed on a sand loam, resting on a clay subsoil. Here should be annually deposited, as they can be conveniently collected, the weeds, coarse grass, and brake of the farm, and also the pumpkin-vines and potato-tops. The quantity of these upon a farm is very great, and are collected and

brought to the yard with little trouble by the teams returning from the field. And here also should be fed out, or strewed as litter, the hay, stalks, and husks of Indian corn, pea and bean haulm, and the straw of grain not wanted in the stables. To still farther augment the mass, leached ashes and swamp earth may be added to advantage. These materials will absorb the liquid of the yard, and, becoming incorporated with the excrementitious matter, double or treble the ordinary quantity of manure. During the continuance of the frost, the excavation gives no inconvenience; and when the weather is soft, the borders afford ample room for the cattle. In this way the urine is saved, and the waste incident to rains, &c., prevented. The cattle should be kept constantly yarded in winter, except when let out to water, and the yard frequently replenished with dry litter. Upon this plan, from ten to twelve loads of unfermented manure may be obtained every spring for each animal; and if the stable manure is spread over the yard, the quality of the dung will be improved, and the quantity proportionably increased. Any excess of liquid that may remain after the dung is removed in the spring, can be profitably applied to grass, grain, or garden crops. It is used extensively in Flanders and in other parts of Europe.

Having explained my method of procuring and preserving the food of vegetables, I will proceed to state my practice in feeding or applying it. It is given, every spring, to such hoed crops as will do well upon coarse food (my vegetable hogs and goats). These are corn, potatoes, ruta baga, beans, and cabbages. These consume the coarse particles of the manure, which would have been lost during the summer in the yard; while the plough, harrow, and hoe eradicate the weeds which spring from the seeds it scatters. The finer parts of the food are preserved in the soil, to nourish the small

grains which follow. The dung is spread upon the land as evenly as possible, and immediately turned under with the plough. It is thereby better distributed for the next crop, and becomes intimately mixed and incorporated with the soil by subsequent tillage. Thus, upon the data which I feel warranted in assuming, a farmer who keeps twenty horses and neat cattle will obtain from his yards and stables every spring 200 loads of manure, besides what is made in summer, and the product of his hogsty. With this he may manure annually ten or twelve acres of corn, potatoes, &c., and manure it well. And if a proper rotation of crops is adopted, he will be able to keep in good heart, and progressively to improve sixty acres of tillage land, so that each field shall be manured once every four or five years on the return of the corn and potato crop.—*J. Buel.*

CHAPTER VI.

Swine.

On the Utility and best Method of Cooking Food for Domestic Animals.—This subject has engaged the attention of practical men in Europe and in this country for many years, and it is a branch of rural economy at all times worthy the careful investigation of the farmer. The Highland Society of Scotland have, in a particular manner, directed the public attention to the comparative advantages of feeding farm-stock with prepared or unprepared food, and have, by liberal premiums, induced numerous experiments to be accurately made, and elicited much valuable information. The conclusions which have been drawn from these and other experiments seem to be,

1. That a great saving, some say one half or more, is effected by cutting the dry fodder for horses and neat cattle, and feeding it with their provender or grain, in two or three daily messes, in mangers. Not that the food is thereby enhanced in its inherent properties, but that, given in this way, it all tells, is all consumed, all digested, *all* converted into nutriment. There is comparatively none wasted or voided, without having benefited the animal. In the ordinary mode of feeding in racks, yards, and in open fields at stacks, it is well known that much is lost, from the difficulty of masticating uncut hay, straw, and stalks, and from its being trodden under the feet of animals and spoiled. Much labour is, besides, saved to the animal, as cut food requires less mastication, and the animal enjoys a longer period of rest.

2. That grain and pulse, as cattle food, are enhanced in value by being ground or bruised before they are fed out, so much as to warrant the expense of sending to mill and the deduction of toll. Indian corn, oats, rye, and other grain, given to farm animals in a dry, unbroken state, it must have been observed by every one, particularly when the animal is high fed, are often voided in a half or wholly undigested state, and are virtually lost. This does not happen when the grain has been ground.

3. That although roots, as ruta baga, mangel wurzel, and potatoes, are improved as fattening materials for neat cattle by cooking, the advantages hardly counterbalance the extra expense of labour and fuel.

4. That for working horses, cooking the roots we have enumerated, and feeding them with cut hay and straw, is of manifest advantage; and that, thus fed, they supersede the necessity of grain.

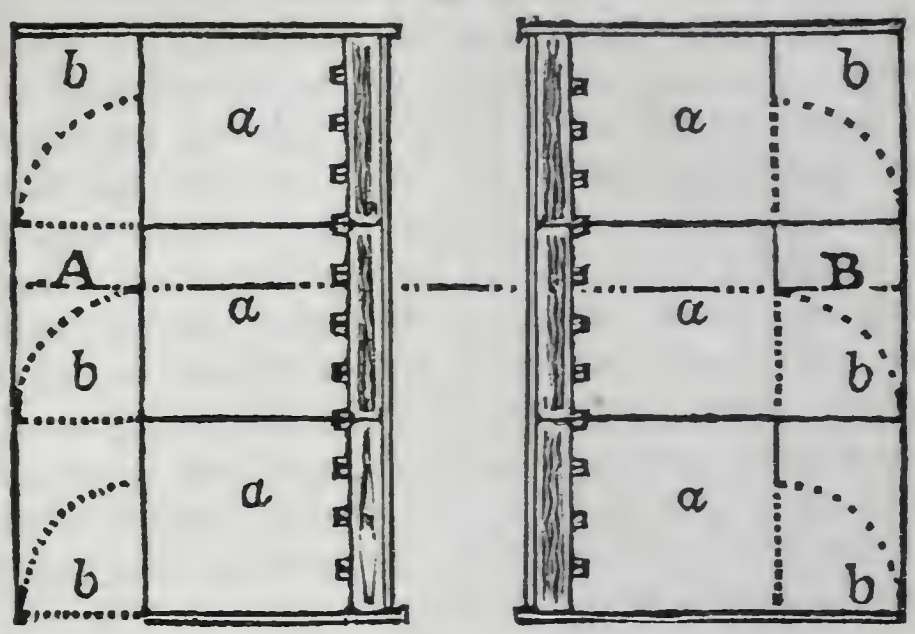
5. That in fattening hogs, there is decided economy in grinding and cooking the food. The exper-

iments upon this subject are many and conclusive. Some estimate the saving at one half the quantity of food. Taking into account the various materials on a farm which may thus be turned to account, we are satisfied that one half the cost of making pork may in this way be saved. Swine are voracious animals, and will eat more than their stomachs can digest, unless assisted by the cooking process. There are upon the farm many refuse matters, as pumpkins, squashes, small potatoes, early and defective apples, and apple pomace, which are of little value except as hog-food; but which, if well husbanded, cooked, and mixed with ground provender, contribute essentially to cheapen our pork. It has been questioned whether the articles we have enumerated are nutritive to pigs when given in their raw state; while all admit, who have made the experiment, that they are highly so when cooked. Cooking undoubtedly adds to their nutritive properties, as it does to the nutritive properties of Indian meal.

Before we offer our views of the most economical mode of cooking food for hogs, and of the apparatus to be employed, we beg leave to submit the plan of a hogpen or piggery, which, with some modifications, is the model of one we examined at the Shaker village in Niskayuna.

Fig. 1 exhibits a ground plan of the building, showing a gangway in the centre, with a range of pens on each side. The breadth is twenty-six feet, and the length may be adapted to the convenience of the builder. The pens are six feet broad and ten feet deep, with a cross partition four feet from the rear, and a four feet door, which is used to close the passage between the front department (*a*) and the department *b*, or to extend the partition between the pens. The different uses of the doors are shown on the two sides in the cut. The pens are calculated for four hogs each, and the section here

Fig. 1.



exhibited will therefore accommodate twenty-four. When the pens require to be cleaned, the doors are shut into the cross partitions, as at A, so that the rear presents an uninterrupted passage, the hogs being confined in *a a;* and as soon as the pens are cleared, these doors are thrown back as at B. The troughs are embraced in the gangway.

Fig. 2.

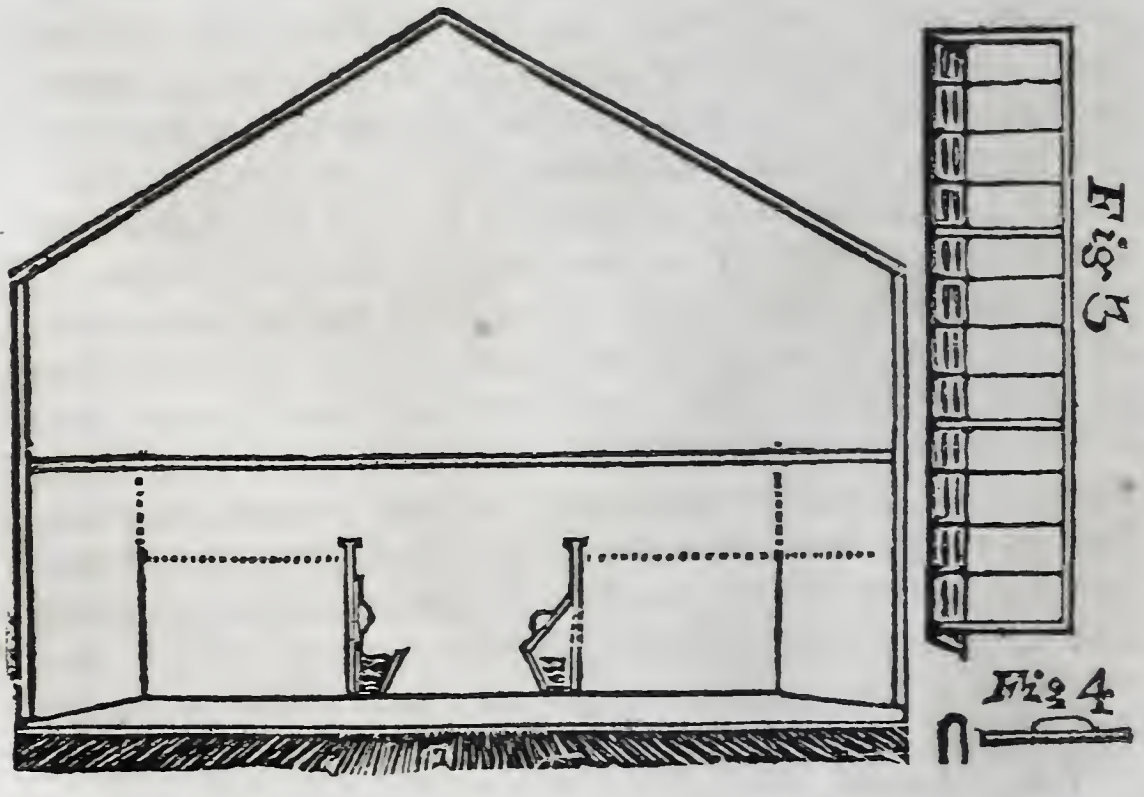


Fig. 2 shows a cross section along the dotted line A. B. The partitions are three and a half feet high, the posts eleven feet, giving seven feet to the basement, and four to the upper story below the roof. The position of the feeding troughs is here shown. They are provided with lids hung with stout hinges above, and may be let down so as to exclude the hogs from the troughs while they are being cleaned or replenished with food, or raised up at pleasure, as shown in this section. Each lid is provided with an iron bolt (*fig.* 4.), which works in staples, and confines the lid in the position required. This section also shows the slope of the floor in *b b*, so constructed that the urine may drain off. The dotted lines represent the size of the building, when, instead of the apartments *b b*, it is wished to let the hogs run in an open yard. For small farmeries, a single range of pens and the gangway may suffice. The loft serves as a storeroom for hog-feed, &c.

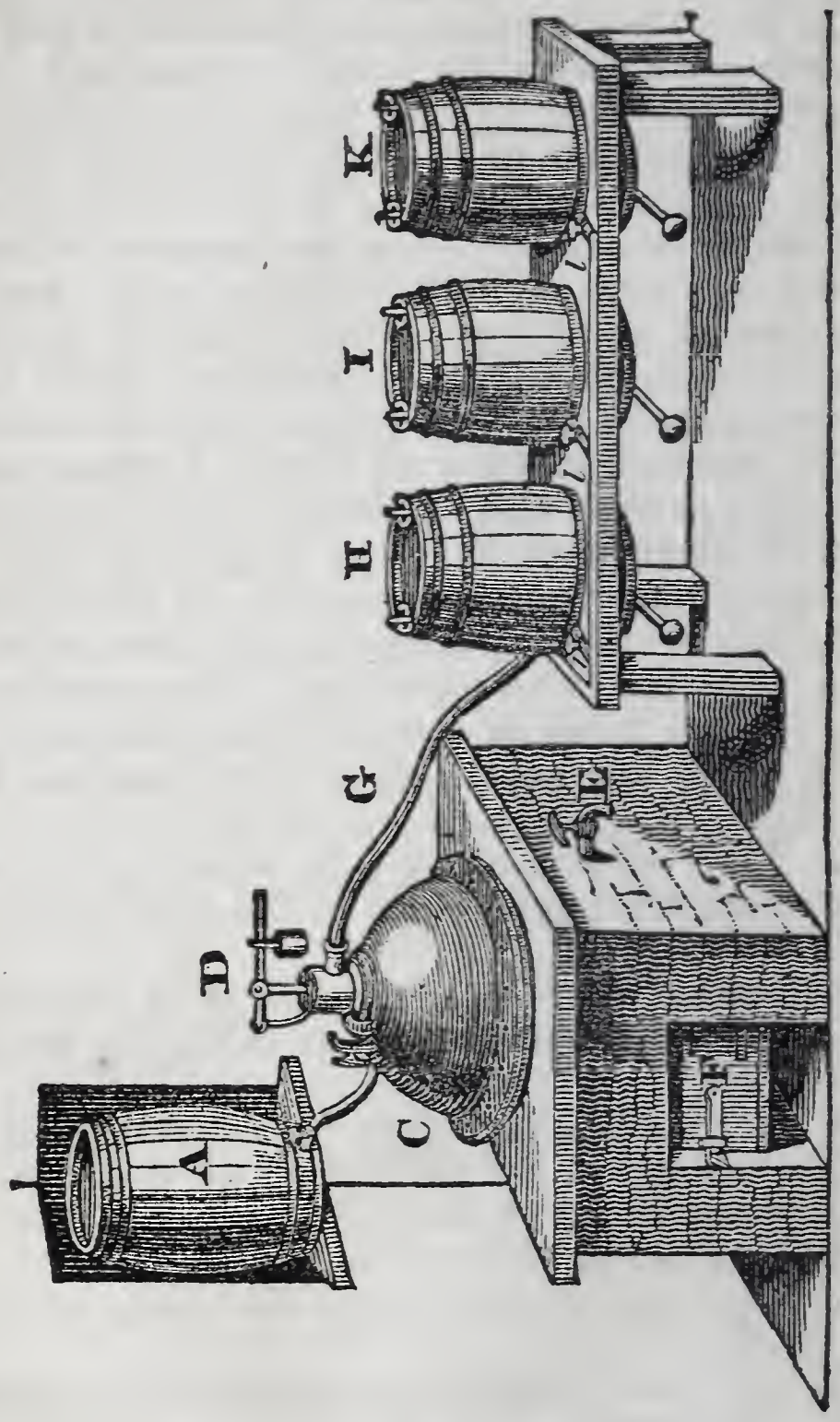
Fig. 3 is a section along C D, showing the studs that prevent the interference of the hogs while eating.

The boiling or steaming room is in one end of the building, and communicates with the passage and the loft.

The peculiarities, or, rather, the advantages of this piggery, consist in the facility which is afforded of cleaning the pens and the troughs, and of depositing the food in the latter without being incommoded by the hogs, and in preventing the hogs worrying each other.

We shall now exhibit the model of a steaming apparatus, calculated for a large establishment. We have shown the plan to an intelligent master in one of our furnaces, who estimates the cost of boiler, pipes, and cocks at $50.

Fig. 5.



A is a barrel or other vessel for containing water and supplying it to the boiler C. D is a safety-valve. At the upper part of the boiler at C are placed two tubes with stopcocks. One of these tubes terminates near the bottom of the boiler. Upon the stopcock being turned, water should always issue from this tube. When, therefore, steam issues from it and not water, this indicates that

the water is too much boiled away, and, consequently, that there is a deficiency of water in the boiler. The other tube terminates within the boiler, near the top. Upon the stopcock being turned, therefore, steam ought always to issue forth. But should water in the place of steam come out, then it will appear that the boiler is too full of water. In this manner the attendant, by turning either stopcock, ascertains whether there is a deficiency or excess of water in the boiler. The quantity of water could indeed be regulated by nicer means; but that described will be found sufficient in practice. F is the furnace, and E is a pipe with a stopcock communicating with the boiler. When it is wished to obtain hot water, it is obtained by this pipe. A pipe G communicates with the barrels H, I, K, and conveys the steam to them; and in these is placed the food to be steamed. By means of the stopcocks *l*, *l*, *l*, the communication can be cut off with any of the barrels, so that the steam may be admitted to one barrel, or two barrels, or three, as may be wished. The barrels in the figure are three, but the number may be extended. Each barrel has a moveable lid, which is kept down by screws, and a sliding-board below, by which the food, when ready, is withdrawn. The barrels are raised on a frame, so that a wheelbarrow or vat may be placed below and the food at once emptied into it.

By means of an apparatus of this kind, roots and other parts of plants may be steamed in a convenient and economical manner.

The relative advantages of steaming and boiling will very much depend, we suspect, on the extent of the establishment. We have tried both, though our steamer was imperfect, and have come to the conclusion that, when the number of hogs to be supplied does not exceed fifteen or twenty, boiling is preferable; as with a good boiler, of the capacity of thirty gallons, from twelve to sixteen barrels of food may be easily cooked in a day. But much depends on the judicious setting of the boiler, so that it may receive the whole advantage of the fire. For this purpose the brickwork should be made to conform to the shape of the kettle, leaving a space of three or four inches between them, until it reaches nearly the top of the kettle, when a tier of brick set edgeways is projected for the flange of the boiler to rest upon; and the bottom of the fire-flue should

be above the bottom of the kettle, or about parallel with the commencement of the slope which rounds its bottom. By this means the flame is thrown upon the sides and bottom, and in a manner that the whole boiler is collapsed with it on its passage to the smoke-flue; and the brickwork being heated, constantly refracts back its heat upon the boiler. A tight cover should be laid over the cooking food to prevent the free escape of the steam, by partially confining which the cooking process is greatly facilitated.

There should be appended to the hoghouse an open yard for straw, litter, weeds, &c., which the hogs, during summer, will work into manure, and into which the dung is thrown from the pen.

Hogs are subject to various diseases, particularly if shut up in a close pen during the time of fattening, which are often suddenly fatal. Prevention is here easier than cure; and many farmers prefer giving their hogs yardroom where they can root in the earth, which is deemed a preventive. Others give them occasionally rotten wood, charcoal, sulphur, antimony, or madder, all of which are considered as aperients, cleansers, or alteratives, and, consequently, as conducing to health. Salt is all important, and should be habitually blended with their cooked food.

Comparative Advantages of Fattening Livestock on raw or cooked Food.—Our hogfeed differs from that of Europe; and the main questions to be decided here are, whether Indian corn is most profitably fed in a dry unground state, in the form of Indian meal, or cooked preparatory to its being fed. Soft or pig corn will be fed on the cob; and potatoes and pumpkins, of which every farm affords, or ought to afford, a considerable supply, should unquestionably be cooked; yet we generally finish off our pork, after the refuse of the farm is exhausted, on sound corn; it gives solidity and flavour to the pork; and the question, we repeat, is, in what form is this sound

corn most profitably given? The following experiments, by Mr. Colman, were instituted in 1833, with a view not only to solve this question, but to ascertain the profit or loss incident to fattening pork with corn, and the age at which it is most profitable to put up swine to fatten.

Experiment I.

Two hogs one year old; one of them a barrow in very good condition, the other a barrow recently gelded, and in ordinary condition, were put up to be fed exclusively upon Indian hasty pudding, or Indian meal boiled with water. We began feeding them the 1st of March, 1831, and weighed them on the 19th of the same month. In the 18 days they consumed six bushels of Indian meal. They were offered cold water to drink, but did not incline to take any. The result:

No. 1 weighed on 1st March	. . .	233 lbs.
" " 19th "	. . . .	269
Gain	. . . . .	36
No. 2 (recently gelded) weighed on 1st March		190 lbs.
" " " 19th "		247
Gain	. . . . .	57

The gain of the two was 93 lbs. in 18 days. The quantity of meal consumed by them was 10 qts. per day to the two. This allows 30 qts. to a bushel, deducting two for grinding. The price of corn at the time was 70 cts. per bushel. The expense of the increased weight is 4.5 cts. per lb.

March 21, 1831. Killed the hog mentioned first in the foregoing experiment. Live weight, 273 lbs. Weight when dressed, 215 lbs. Loss in offal, loose fat included, 59 lbs., or a little more than one fifth.

Experiment II.

No 2, mentioned above, weighed on 23d March		253 lbs.
" " " " 30th April		312 "
In 38 days, gain	. . . .	59 lbs.

No. 3, a shoat purchased from a drove, weighed on	28th March	100 lbs.
" " " "	on 30th April	151 "
Gain in 33 days		51 lbs.

This is a fraction over 1 lb. 8 oz. per day each, nearly 1 lb. 9 oz.

In this case their food was exclusively boiled potatoes, mashed, with Indian meal. Exact amount consumed not ascertained, but fed as freely as they would bear.

Experiment III.

The two last-named hogs were for the next twenty days put upon Indian hasty pudding exclusively, with the following result:

No. 2 weighed on 30th April . . .	312 lbs.
" " 20th May . . .	382 "
Gain in 20 days . . .	70 lbs.
No. 3 weighed on 30th April . . .	151 lbs.
" " 20th May . . .	185 "
Gain in 20 days . . .	34 lbs.

The two, in the above named 20 days, consumed four and a half bushels of meal cooked as above. Meal 78 cts. per bushel. Gain of the two 104 lbs. in 20 days.

Experiment IV.

Sundry swine purchased from a drove, and fed with meal and potatoes washed and mashed.

28th March, 1831.		19th May, 1831.		
No. 1 weighed	97 lbs.	165, gain in 52 days	68	lbs.
2 "	134 "	182, "	48	"
"	100 "	186, "	86	"

The two following raised on the farm and fed as above:

25th April, 1831.		19th May, 1831.		
No. 4 weighed	151 lbs.	206, gain in 24 days	55	lbs.
5 "	140 "	165, "	25	"

Experiment V.

In this case it was not intended to force their thrift, but to keep the swine in an improving condition. They were shoats of the last autumn, and were of a good breed.

Tuesday, 3d April, 1833. Put up four shoats and began feeding them with Indian hasty pudding.

3d April.	22d April.			25th June.		
No. 1, 177 lbs.	202 lbs.,	gain	25	264 lbs.,	gain	62
2, 119 "	153	"	34	226	"	73
3, 150 "	170	"	20	218	"	48
						[Total 183 lbs.
4, 121 "	145	"	24	Killed 30th May.		

From 3d April to 22d April, the above swine consumed seven bushels and one peck of Indian meal. From 22d April to 25th June, seven bushels of Indian meal cooked as above.

One of the above, No. 4, was killed on the 30th May; being absent, the live weight was not ascertained.

On the 25th June the three remaining hogs were weighed, and in the 63 days, from 22d April to 25th June, they had gained in that time 183 pounds as above.

After 30th May, when one of them was killed, one peck of meal, made into hasty pudding, with a small allowance of the waste of the kitchen for a part of that time, lasted them three days, that is 22.25 or less than a quart, say 7-8ths of a quart per day to each.

☞ At first we employed half a bushel of Indian meal to make a kettle of hasty pudding; but we soon found that a peck of meal, by being boiled sufficiently, would make the same kettle nearly full of hasty pudding, and of sufficient consistency. The kettle was a common-sized five-pail kettle, set in brickwork in the house; and it was remarkable that the peck of meal produced nearly the same quantity of pudding that we obtained from the half

bushel, which showed the importance of inducing the meal to take up all the water it could be made to absorb.

The price of Indian corn was at that time 75 cts. per bushel, 30 quarts of meal to a bushel, deducting the toll. The amount of meal consumed in the whole time, from 3d April to 25th June, was 14 1-4 bushels, the cost $10 69; the total gain, making no allowance for the gain of No. 4 from 22d April to 30th May, which was not ascertained, was 287 lbs.

The gain of Nos. 1, 2, and 3, from 22d April to 25th June, was 183 lbs. in 63 days; and allowing one peck to serve three hogs for three days, required 5 1-4 bushels, the cost of which was $3 94. The live weight could not be estimated at less than 4 cents per lb., when pork was at market 6 cents.

The value of the 183 lbs., therefore, was equal to $7 32, or at 5 cents to $9 15.

The gain of the swine for the first 19 days, from 3d to 22d April, was,

No. 1,	26 lbs.	or	1.368	per day.
2,	34	"	1.789	"
3,	20	"	1.052	"
4,	24	"	1 263	"

The gain from 22d April to 25th June, 63 days, was,

No. 1,	62 lbs.,	or	0.984	per day.
2,	73	"	1.158	"
3,	48	"	0.761	"

The difference of daily gain in the two periods was attributable to the diminished quantity of meal. The question then arises, whether the first mode of feeding was as economical as the second?

In the first 19 days,	7	bushels	1	peck	con'd	gave	164 lbs. gain.
" next 63	"	5	"	1	"	"	183 "

Had the first gain been in proportion to the second gain, in reference to the meal consumed, the seven and one fourth bushels, which gave 104 pounds, should have given 252 5.7 pounds. This great dis-

parity can be explained only in the more economical preparation of the meal, by which a peck, taking up as much water as it would contain, gave a kettle nearly full of pudding, when half a bushel of meal, imperfectly prepared, gave little more. This seems to demonstrate the great advantage of cooked food, both as it respects its increase of bulk and the improvement of its nutritive properties. Whether it would apply to those substances whose bulk is not increased by cooking, equally as to Indian meal and the like, is a matter which experiments only can determine.

Such are some few trials in reference to the feeding and fattening of swine, which I have made, or information of which I have obtained from other sources, which may at least lead the inquisitive farmer to farther experiments and inquiries on a subject of great importance to his interest. The inferences to be made from them I shall leave to others. The results, as will be observed, are not uniform. The thrift of animals must depend on various other circumstances besides the kinds or quantity of food given them. Much depends on the breed, as every farmer knows; much on the health of the animal; something on the season of the year. I failed in attempting to fatten several swine in one case, though they were carefully attended, and various kinds of feed were tried, and the failure was totally inexplicable until they were slaughtered, when the intestines were found corroded with worms, resembling those found in the human stomach, and this, I have no doubt, prevented their thrift. The same fact has occurred in another instance, and with the same result. I failed in attempting to fatten some other swine, who had been driven a considerable distance and exposed, probably not even half fed on the road, to severe cold and storms. Some of them were frostbitten in their limbs; and though attended and fed in the most careful manner, they made

no progress for months. In an experiment recently made, of giving swine raw meal mixed with water, I have found a falling off in their gain of nearly one half, compared with giving their food cooked, such as boiled potatoes and carrots, mixed with meal while hot; the result being, in a sty containing a number of swine, 279 as to 500. In respect to confinement or freedom, various opinions are entertained. Elder Turner, of New-York, says, "that hogs should never know what liberty is, but should be kept close all their lives, and as inactive as possible. That, by this method, double the quantity of pork can be produced with the same expense of feed."* F. Peabody, Esq., informed me that the Shakers at Canterbury, N. H., told him that they deemed it indispensable to the thriving of their swine that they should have access to water to wallow or wash themselves in, and that they by no means did so well without it. On this point I have had no trial farther than to satisfy myself that fatting hogs are injured by being suffered to root in the earth.

With respect to the age at which it is advantageous to put up swine to fatten, I have only to remark, that it is with swine as with other animals, there are some breeds which come much sooner to maturity than others. A successful farmer in Saratoga county, N. Y., says that March pigs, killed about Christmas, are the most profitable for pork. Four pigs of what is called the grass breed were slaughtered at Greenfield, New-York, which weighed 348 lbs., 318 lbs., 310 lbs., and 306 lbs., at nine months and seventeen days old.

On this point, however, I take leave to present a letter with which I was honoured by John Lowell, Esq., whose authority in the agricultural community is justly estimated.

* New-York Memoirs of Agriculture, vol. ii., p. 50.

Boston, April 18, 1831.

"To Rev. Henry Colman,

"Dear Sir—I have been prevented by the state of my eyes from answering your inquiries as to my experience in raising old or young pigs. * * I never wintered any pigs, as no person resides on my place from December 1st to May 1st. It was therefore matter of importance to me to ascertain on what description of pigs, or, rather, of what age, the most flesh could be put in my limited time with similar treatment. I may say that I have fully and clearly ascertained, from a trial of 20 years, that young pigs of from 25 to 30 pounds will give nearly double, in some remarkable cases three times, as many pounds as shoats of six months, weighing from 100 to 150. I have taken two pigs of 100 lbs. each, age six months, and never was able, between May and November, to get them above 180, rarely above 170. I have taken three pigs of about 30 lbs. each, and on the same food which I gave to the two that would weigh from 170 to 180 each in the same period; nay, I have taken pigs of 200, and never could get them to weigh more than 300 in seven months on my food. The way I ascertain the quantity of food is, that I never give anything but the produce of my dairy and the refuse of the garden, peaches, apples, and cabbage, which are uniform, generally.

3 pigs of 90 wt., or 30 wt. each, will give ordinarily 510 lbs.
less original wt. 90, often not more than 60.

Gain, 420 lbs.

2 pigs of 100 wt. each will give ordinarily 340 lbs.
Less original wt. 200

Gain, 140

"But the three pigs of 90 will not consume for the first three months half so much as the two of 100 each, and I have kept a fourth and sold it in August for quarter pork.

"There is nothing new or remarkable in these facts. It is the law of the whole animal creation. It is true of the calf and of man. The child of 7 lbs. quadruples its weight in 12 months; and the calf of 60 wt., if fine and well fed, will weigh 600 wt. at the end of the year, and (if a female) will not double the last weight at any age.

* * * * * * * *

"Yours very respectfully,

"J. LOWELL.

"P. S. It should be remarked that the weight at purchase is live weight, and at sale, dead or nett weight, because in truth to the owner this is the true mode of considering the subject. No doubt my sort of food is peculiarly favourable to young animals, it consisting in a very liberal allowance of milk. If the older pigs were at once put on Indian meal, they would attain to 250 at a year old, but the cost of the meal, 70 cents per bushel, would amount to nine dollars, and if the first cost, 5 dollars 50 cents be added, and the pig sold at 6 cts., there would be but two dollars gain on two pigs of 100 lbs. each, while three small pigs without meal, fed on milk, would give 24 dollars in the same time. I do not mean to give minute details, but general views.

"As an important qualification of the foregoing statement, it should be added that shoats of six months bought out of droves, have usually been stinted in their growth, and animals, like trees, recover slowly after a check. I presume, if shoats were taken from a careful and liberal owner, the difference would be less. But, as a general law, it may be safely affirmed that weight for weight at the purchase, the younger the animal the greater the positive, and the far greater the nett gain. At least such is my own experience and belief."

The foregoing letter of this intelligent and practical farmer is entitled to particular consideration. I have one or two other statements which de-

serve attention. It is stated in the Domestic Encyclopedia, article "Soiling," that "twenty-five shoats were fed for three months with green clover cut from less than one acre; they were then fed on Indian corn, and, when killed, weighed three thousand pounds." This is certainly an extraordinary statement, and I have no other authority for it than what is here given. But the Rev. Thomas Mason, of Northfield, Mass., showed me the 27th September last, three fine thrifty swine about nine months or more old, nine tenths of whose feed, as he assured me, since the 13th of May last, had been obtained from one eighth of an acre of clover, cut and given to them green.

The preceding facts and experiments encourage the belief that hogs may be raised and fattened by the farmer to advantage, where corn is worth about seventy cents per bushel, and his pork will bring him six cents per pound. Like almost every other business, especially of an agricultural nature, success must greatly depend on skill, care, selection, and good management. The best swine that I have ever found have been in dairy countries, for there cannot be a doubt that milk and whey for every animal are among the most nutritious of aliments. Indian meal probably ranks next, though many farmers prefer a mixture of provender, such as corn, oats, rye, or barley; but I believe, in all cases, cooked food will have a decided advantage over that which is given in a raw state; an advantage more than equivalent to the labour and expense of its preparation. Potatoes are a valuable article of food, but the pork is not so good as that fattened upon corn. Carrots are more nutritious than potatoes. Corn given in a raw state or on the ear is a most wasteful management.

Swine ought to be kept on every farm in sufficient numbers to consume all the offal and waste of the dairy and kitchen. If, beyond this, a breed can be

obtained which will arrive at early maturity, and which can be kept advantageously grass fed, or kept at a small expense and in an improving condition through the summer; and being put up to fatten early in autumn, and forced as much as possible, so as to be sent to market early in the winter, the farmer will ordinarily find a fair profit in this branch of husbandry. A very great advantage is found in the keeping of swine from the valuable returns of manure both in quantity and quality which are obtained from them, where care is taken to supply them with raw materials for the manufacture. Too much care cannot be bestowed in the selection of the breed and the general health of the animal when put up to feed; and it is strongly recommended to every careful farmer occasionally to weigh the animal and measure the feed, that he may ascertain seasonably on which side the balance of debt or credit is likely to fall. Nothing is more prejudicial to good husbandry than mere guesses and random conjectures; and though the result of our operations may not meet either our wishes or expectations, an intelligent and reflecting mind will be always anxious, as far as practicable, to know precisely how far they correspond with or disappoint them. Truth, exact, simple truth, in everything, is the proper pursuit and most valuable possession of the human mind; and, more nearly than anything else, connected with man's true interest and happiness.

DAIRY HUSBANDRY.

CHAPTER VII.

Dairy Husbandry of Holland.

The Highland Society of Scotland, considering the advantages that might be derived from an acquaintance with the modes of managing dairies in Holland, offered, in 1831, a premium for the best report upon that subject, founded on personal observation. The premium was subsequently awarded to John Mitchell, whose report was published in 1833. We abstract from this report such facts as are likely most to interest our dairy farmers and lead to their improvement. We will barely premise, that the products of the Dutch dairy, particularly the butter, are in higher demand than those of any other country. Vast quantities of butter are annually exported to Britain, the West Indies, &c. 116,233 cwt. of butter, and 167,913 cwt. of cheese, were brought from Holland to England in 1830. Were the same care taken in manufacturing our butter which is bestowed in Holland, we should find a brisk foreign demand for all our surplus stock. But, at present, our butter is inferior, will not bear transportation to a warm climate, and will not compete with that of Holland.

Pasture.—The pastures in Holland have been reclaimed from the ocean. They are flat, low, and moist, the water in the small canals or dikes always rising nearly to their surface. They are, of course, permanent, or are seldom broken with the plough.

They are top-dressed every third year with cow-house manure, mixed with the scrapings of the small canals, and the first year after dressing, reserved, generally, for hay.

Supposing the whole growth 700, the Dutch farmers consider that there grows, for the consumption of the cow, from the beginning of spring till May, 135 parts; in June, 20; July, 135; August, 95; September, 55; October till winter, 80.

Cows are particularly selected for the dairy. Their price is about 9 or £10 sterling—40 to $45. They are generally fattened and turned off to the butcher at eight years old, and bulls at four or five. The cows are turned to pasture in March or April, and are at first covered with a very thick cloth of tow, covering the upper half of the body from the shoulders to the tail, to prevent diseases from cold. They are pastured about 30 weeks. Hay is their common food in winter, though rape-cake and brewers' grains are sometimes added. The byres or cowhouses are generally lofty, airy, paved with large square bricks, and kept perfectly clean. The roof is about 10 feet high. There are no racks or mangers, but the food placed in gutters, always clean, near their heads. Gutters in their rear serve to carry off the urine and dung, and these gutters are also kept clean.

Process of manufacture.—The cows are always milked by the men, and the butter and cheese made by the women, generally of the family. Ninety cows are managed by nine men and two women. There is generally one man required to ten cows; while two women are considered enough for any dairy. The farmer reckons that he can make 100 guilders, about 40 dollars, per annum by each cow.

Butter.—There are three distinct kinds of butter made in Holland; *grass butter*, made when the cows are at grass; *whey butter*, from the whey of sweet-milk cheese; and *hay butter*, made in winter.

Grass butter.—The cows being carefully milked to the last drop, the pitchers containing the milk are put into the *koelbak.* When the cream has been gathered and is soured, and if there is a sufficient quantity from the number of cows, they churn every 24 hours, the churn being half filled with the soured cream. A little *boiled* warm water is added in winter, to give the whole the proper degree of heat, and in very warm weather the milk is first cooled in the *koelbak* or cooler. In small dairies the milk is sometimes churned, when soured, without separating the cream. The butter, immediately after being taken out of the churn, is put into a shallow tub, called a *vloot*, and carefully washed with pure cold water. It is then worked with a slight sprinkling of fine salt, whether for immediate use or the barrel. When the cows have been three weeks at grass, the butter is delicious, is made in fanciful shapes of lambs, stuck with the flowers of the polyanthus, pyramids, &c., and sells as high as 44 stivers, 60 to 70 cents, the 17 oz. or Dutch pound. If intended for barrelling, the butter is worked up twice or thrice a day, with soft fine salt, for three days, in a flat tub, there being about two pounds of this salt allowed for fourteen pounds of butter; the butter is then hard packed by thin layers into casks, which casks are previously carefully seasoned and cleaned. They are always of oak, well smoothed inside. Before being used, they are allowed to stand three or four days, filled with sour whey, and thereafter carefully washed out and dried. Each cow, after being some time at grass, yields about one Dutch pound of (17 1-2 oz.) butter per day.

We beg our dairy-women to mark two points in the preceding process. 1. *No salt is used but what is incorporated with and dissolved in the butter, and which is necessary to give it flavour;* and, 2. *The but-*

ter intended for keeping *is worked from six to ten times*, to incorporate the salt, and *to separate from it every particle of liquid*, which, if left in it, would in duce rancidity.

Hay butter undergoes a like process.

Whey butter.—The whey is allowed to stand three days or a week, after being separated from the curd, when the cream is skimmed off, or the whey itself put into the churn, and the butter is formed in about an hour. By this process, in winter one pound of butter is obtained from each cow in a week, and in summer 1 1-2 pounds. The relative prices are generally, grass butter 8 1-2 stivers, hay butter 7, and whey butter 6.

Cheese.—There are four kinds of staple cheese made in Holland; the *Edam* and *Gouda*, both made from unskimmed milk; and two kinds, called *Kanter cheese*, made from milk once and twice skimmed.

Edam cheese.—The process of manufacture of the Edam cheese is as follows:

The milk being yearned as soon as taken from the cow, when coagulated, the hand or a wooden bowl is passed gently two or three times through the curds, which are then allowed to stand a few minutes; the bowl or finger is again passed through them, and they stand a few minutes. The whey is then taken off with the wooden bowl, and the curd is then put into a wooden form (of the proper size and shape of the cheese to be made). This form is cut out of the solid wood by a turner, and has one hole in the bottom. If the cheese is of the small size (about 4 lbs.), it remains in this form about ten or twelve days; if the large sized, it remains about fourteen days. It is turned daily, the upper part during this time being kept sprinkled with about two ounces of purified salt of the large crystals. It is then removed into a second box or form of the same size, with four holes in the bottom, and put under a press of about 50 lbs. weight,

where it remains from two to three hours if of the small size, and from four to six if of the large size. It is then taken out, and put on a dry, airy shelf in the cheese apartment, and daily turned over for about four weeks, when they are generally fit to be taken to market.

Alkmaar, in North Holland, is the great market for Edam cheese. It is not uncommon to see 800 farmers at the market, and 470,000 cheeses for sale on one day. The price there averages about 30*s.* per cwt. ($6 66).—*Cultivator.*

Gouda cheese.—This kind of cheese is also made from the milk immediately on its being taken from the cow. After gradually taking off the principal part of the whey, a little warm water is put upon the curd, which is left standing for a quarter of an hour. By increasing the heat and quantity of water, the cheese is made hard and more durable. All the whey and water is then taken off, and the curd is gradually packed hard into a form cut out by the turner, flatter and broader than the form for the Edam cheese. A wooden cover is placed over it, and the press, with a weight of about 8 lbs., put upon it. It is here frequently turned, and altogether remains under the press about 24 hours. The cheese is then carried to a cool cellar, put into a tub containing pickle, the liquid covering the lower half of it. The water for the pickle is boiled, and about three or four handfuls of salt melted in about thirty imperial pints of water. The cheese is not put in until the water is quite cold. After remaining twenty-four hours, or, at most, two days, in the pickle-tub, where it is turned every six hours, the cheese, after being rubbed over with salt, is placed upon a board slightly hollowed, having a small channel in the centre, to conduct the whey which runs off into a tub placed at one end. This board is called the *Zouttank*, upon which several cheeses are placed at a time. About two or three ounces

of the large crystallized salt is placed upon the upper side of the cheese, which is frequently turned, the side uppermost being always sprinkled with salt. It remains on the zouttank about eight or ten days, according to the warmness of the weather; the cheese is then washed with hot water, rubbed dry, and laid upon planks, and turned daily, until perfectly dry and hard.

The cheesehouse is generally shut during the day, but must be open in the evening and early in the morning.

Gouda is the principal market for this kind of cheese, where it sells at about 35*s*. per cwt.

Each cow at grass in Holland is calculated to give about three or four pounds sweet-milk cheese per day.

We omit the method of making the *Kanter cheese*, which is similar to our skim-milk cheese, and of the cheese utensils.

The milkhouses are generally between the dwelling and cowhouse, in a square apartment, in a corner of which is the cooler; it is airy, roomy, and paved with square bricks, the upper part serving for churning, making cheese, &c.; and descending a few steps, into a sort of cellar, is the milkroom, having two or four windows, which are opened or shut according to circumstances.

The cheesehouses are also generally cellars, kept clean and well ventilated.

The Dutch are remarkably particular as to the quantity and quality of their salt, of which there are three kinds manufactured; and it is this, our reporter thinks, which is the principal cause of the sweet and delicious flavour of their butter, which, although well-flavoured, hardly tastes of salt, or, rather, of that acrid quality which is perceptible in the butter of Great Britain.

Cleanliness governs in all the Dutch dairies. Every dwelling-house is a model and a pattern. They

seem to vie with each other on this point. The cowhouse is pure and clean, not a particle of filth being to be seen in it; the cows, says Mr. M., are as clean as if they were in a dining-room; the milk and cheesehouses, and, in short, every part of the house, are free from dust and dirt of any kind. The whole apartments, even the byre (stalls) and hay-house, are generally under one roof; and the cleanly system and the admirable arrangement give that comfort and pleasure which are too often wanted in other countries.

CHAPTER VIII.

Dairy Husbandry of Herkimer, N. Y.

To the Editors of the Cultivator:—Agreeably to your request, I submit to your disposal an article on cheese husbandry, together with some statements and observations on the rapid increase, extension, and improvement in that department of agriculture in a narrow district on the north side of the Mohawk river, and second tier of towns, and in the counties of Herkimer and Oneida. Over this district was spread a sparse population as early as the year 1800, and by 1815 it had become a tolerably well-settled country. From about this time to the commencement of navigation on the eastern section of the Erie Canal, there was here little advancement in improvement or wealth.

This district, in length about 20 miles, is hilly, well watered, and peculiarly adapted to grazing, but not so to wheat. From 1806 to 1815, the subscriber (bred to the use of the axe, plough, and scythe) made a cheese dairy on the farm whereon he now

lives, of from twenty-five to thirty cows. Cheese was then not an article of export; it was a dull article, secondary to growing young cattle, horses, and wool. About 200 lbs. of cheese to each cow in the season, at about 6 cts. per lb., "in trade," was considered about a fair income in those days, and is supposed to be so still in many large sections of our country. About that time I reduced my dairy to a mere family use. Not long after this time, some cheese speculators from Berkshire county, Mass., came into Norway, in said district, bought their cheese, a few tuns, at low prices, made contracts for longer or shorter periods, and by theory and practice put a few farmers on a good manufacturing course, and thus encouraged them to extend their dairy operations, and they have been extending till last season. It is computed that about 1300 tuns of cheese were exported from this district, and that the business is rapidly extending. Whether it is soon to be overdone, time only can determine. It is now questionable if there be in any town in the state a greater proportion of opulent and independent farmers, in proportion to its population. Most of the little farms are now so amalgamated, that it is said to be difficult to sustain district schools, and open roads in winter, or hire any labourers by the day in some sections.

Of all the products of agriculture to be seen in the great markets, in none can there be found so great diversity of quality and masses of inferior qualities, as in that of cheese; none evince such general want of theory and system. I am speaking of the great mass. Great improvements in any branch of industry usually proceed from sections where there is a community of exertion and spirit of enterprise, rivalship, and emulation directed to any one given object. And we have here also at this day much advantage in sale as well as in improvement, over an insolate dairy in another sec-

tion. Here the greatest cheese-dealers in New-York and other cities come to select and purchase their supplies.

In 1828, *we* (myself and sons) commenced cheese-making again from forty cows, as a prime object, and in the full conviction that there had been and might be, in that department, great improvement, both in the manufacture and management of cows, to get the greatest yield; that the principles involved in cheese-making might be elicited, and developed, and reduced to system, if not to science, by experiments, by interchange of views with intelligent farmers, and observing their process. Here the business conversation when farmers meet turns much on this subject. How much cheese per day, each cow? In the various seasons of the year, how much each cow through the season? are passing questions, and are put by friends remote also. Answers to these, and the theory of cheese-making, the subscriber has been often called upon to put on paper, and to point out, as distinctly as might be, the difference between the former and the latter process, as practised by himself and others. This has been done by saying that the yield per day at full grass, in May, will range from two and a half to four lbs. each cow as they come from the press, and will shrink about ten per cent. at six months maturity. The yield per cow in this section, through the season, may range from 250 lbs. to 500 lbs. each cow; the latter, however, is an extreme point, at which very few arrive, the calf being taken from the cow the first week. Last year we made from 78 cows 32,000 lbs. Our cows, though good for so large a number, are not as select as some smaller lots. Others had greater yields.

In stating the difference between the former and latter process of making, we say that less heat on the milk and through the making process, and less salt has been applied; the cheese made soft, and

preserved in shape and from spreading and cracking, and the depredations of flies, by bandaging. This is done with thin, cheap cotton cloth soon after it comes from the press, if the weather be hot. Cheese-making is a chymical operation, subject to atmospheric influences, and to know how to meet its consequent exigencies consists, in a great measure, the art. The milk is "set" (rennet applied) in warm weather considerably below the warmth of milk directly from the cow. Cool weather requires more warmth, as the heat is continually passing off. The rennet should be free of taint, and made in quantity to last several weeks, that its power can be relied upon to "fetch the cheese" in three quarters of an hour, or be sure in an hour to be so congested as to be ready to "break up," which is done with the hands from bottom to top of the tub or vat, or with a utensil made of fine brass wire like a riddle, in half inch squares, a sharp rim, and two bails crossing each other higher than the milk in the tub. It is then left a short time to settle; then begin to dip off the whey, and of the first put some over the fire, and, as soon as may be, gradually increase the warmth in the tub, dipping off the whey and making fine the curd, endeavouring by all means to keep the whey as green as possible; the greener the whey the richer and more cheese. For the last half hour, which we call the scalding process, we have very little more than animal or milk heat in the tub, with the curd made nearly as fine as Indian corn, which, if all works well, is ready to be dipped off into a cinque or basket in about two hours from the setting. If the whey turns whitish, and smells rank and sour in hot weather, less heat should be applied, the process hurried on, and the salt applied as soon as may be, or the cheese will be much smaller, dry, and hard. Those who apply greater heat in scalding, usually cool off in the tub with cold whey or

water. But, as tending to be more round and adhesive, we prefer cooling by exposure to the atmosphere, in grinding up the curd in a mill (after the whey is pressed off in a strainer), so as to be ready to receive the salt, which is 2 lbs. of dry salt to 100 lbs. cheese, made so dry that very little can pass off in the whey. No injury can be sustained by severe pressing; it may as well be done in one as two days; it must be effectual.

The colouring (if any) should be of annato, dissolved in pure strong ley, kept in a demijohn or glass bottle. One large spoonful may colour the milk for 20 lbs. of cheese. The colouring on the outside should be the same, very much diluted, and applied with a brush as soon as the cheese comes from the press. After drying an hour, it should then be ointed with butter or lard, and ever kept moist with the same to prevent cracking.

We do not darken our cheeserooms or attempt to keep out the flies, but in hot, sultry weather open the windows and doors, and give them air. Cool dry winds blowing directly on will crack the cheese. Black or Cayenne pepper applied to the cracks or unsound places will prevent depredation by flies. In extreme hot weather it may be well to let the cheese pass one day without turning. We keep up a generous warmth in our cheesehouses spring and fall, and in all the cool, damp days in midsummer, and so greatly accelerate the maturing process. The soft cheese ripens much sooner than that made dry and hard. The latter will dry sooner, but maturing and drying may be very different. Cheese will shrink in weight three to one in October that it will in August, and yet it will ripen three to one in August that it will in October; it ripens like the vegetables, in proportion to the warmth of the atmosphere. Many suppose that large cheeses require more time to ripen and mature than small ones, but we think not. Is not the ripening process of a chym-

cal nature, rather accelerated by increased mass, as are those of the brewer and the baker in their chymical operations? A very small cheese or piece of cheese will soon become dry, but without maturity or taste. Making cheese night and morning from milk directly from the cow has often been tried in this vicinity, but I know of no one who continues the practice. The yield is said to be greater, but the cheese rank, retaining that kine animal taste peculiar to milk directly from the cow. We carefully avoid extra heat, even on any part of the milk, as tending to prepare the oily material for a separation when coming to maturity on the shelves. In preparing the milk for the rennet, we therefore choose to heat much milk a little, rather than heat little much. Large tin vats, adapted to the size of the dairy, are coming into use; by this vat, to contain 300 gallons, we had anticipated an absolute certainty of having sweet milk in extreme hot weather; but after a severe thunder-storm our milk was lobbered worse than ever. Do large metallic reservoirs attract the electricity with which the atmosphere is charged at such a season?

The modern plan of making cheesehouses large, that the cheese be chiefly kept on counters, is a great improvement.

Steuben, settled by that noted baron, being in the same range of towns, and adjoining, is almost wholly devoted to butter-making. I have not the means to give any detail, or to state the amount sent to market last year.

The pineapple cheese, weighing from seven to eight pounds each, is made here to considerable extent, mostly, *now*, by the small dairies. The making process, till it is fitted for the press, is much the same as has been here detailed; some add a little more salt. The shrinkage is considerable more, and the dairy furniture more costly; and the whole labour, till fit for market, may be about the same.

It is chiefly made under contract, from eight to nine cents, unless the purchaser finds the pressers, nets, and trenchers; if he do so, seven to seven and a half cents. It is pressed in wooden semiblocks, griped together, and, when taken from the press, suspended in a net till so hardened as to stand on a trencher made for that purpose, till fit for market. We estimate a loss of three pounds weight of cheese for every pound of butter taken from it.

E. PERKINS.

CHAPTER IX.

Gardening.

THERE are few subjects more apt to excite the surprise of intelligent foreigners than the almost total neglect of our farmers to cultivate a garden; and the inference they draw from this omission is complimentary neither to our good sense nor our good taste. In most European countries, a well-cultivated garden is not only common among farmers, but even the humble cottager, who lives upon his daily earnings, prides himself in the neat cultivated patch that surrounds his cottage, which administers largely to the sustenance of his family, and affords a variety of grateful delicacies which cheer his toils and multiply his enjoyments. But we need not cross the Atlantic for evidence of the economy and comforts of a garden. We are not wholly destitute of gardens nor of taste; and there is, perhaps, no branch of rural improvement that is making greater progress among us than this. We have, probably, advanced farther in improvement in horticulture during the last twenty years than in the preceding century. The work will progress. Who

among us that has known the pleasure of daily partaking of fruits and vegetables, in all the variety of our climate, freshly plucked or gathered from his garden, does not esteem them among the choicest blessing of life? Our old men yet remember the time when potatoes were hardly deemed worth cultivating, or when they were considered as innovating upon the settled rules of the farm, and when half a dozen bushels were the extent of a farmer's crop. Yet this root is now deemed indispensable, and its cultivation, on a large scale, considered as a matter of economy. It forms the principal food in countries where it was once unknown. What the potato was a century ago, many fine fruits and garden vegetables are now; treasures unknown, or misprized by the mass of farmers. The products of a kitchen garden materially lessen the consumption of more expensive food, afford a grateful variety for the table, and are highly promotive of health. They are, besides, matter of substantial profit to the cultivator, for there is scarcely a district of our country which does not furnish a market for any surplus that is produced. What man would consent to have destroyed a fine vine, or peach, plum, or pear-tree, which produced him choice fruit, for ten times what it cost him? We have in our mind a friend who cultivates two acres in fruit and vegetables; and we know he has repeatedly sold in a year, of the former, more than a thousand dollars worth, and had a constant supply of both for his table. The outlay for all this was but trifling, for he soon became self-taught, and propagated his own fruit-trees. A greater income this, from two acres, than many farms of a hundred yield.

To descend somewhat to detail. Say a choice grapevine will cost two or three shillings; a plum four; a pear three; and a peach two; and currants and gooseberries enough to make up, in the whole, two dollars. We give nursery prices for the choi-

cest fruit. In a few years the vine will yield him a bushel or two of grapes, and the trees a bushel or more of fruit each, which will be worth in market or in his family at least ten dollars, with a fair prospect of a rapid increase in the product. Having formed the nucleus, the boys, with a little practice, will soon acquire the art, which every farmer ought to possess, of increasing the quantity and variety, by budding, grafting, layering, &c. And the labour that will be required in doing this need abstract nothing from the profits of the farm; the hours that are misspent or wasted in idleness will suffice for the task. Every plant thus produced will become an object of interest. In 1832, the fruit from two pear trees sold for $45, at the fair market price.

It is not alone from mercenary views, and the mere gratification of the animal appetite, that we recommend the cultivation of a garden. The garden administers to the wants of the mind as well as of the body. We are endowed with senses other than the sense of taste, which may be made to contribute much to the higher enjoyments of life, and which receive gratification in the beauties and fragrance of the vegetable kingdom. He who realizes in the trees and flowers of the garden, the wonderful handiworks of his Creator, provided for the wants and comforts of man, possesses a source of happiness unknown to the mercenary worldling. The pleasures which arise from the beauties of the natural world are pure and unalloyed, and are fraught with humility and benevolence.

In order to facilitate a knowledge of propagating, and the introduction of good fruits, we have procured cuts illustrating the most popular modes of grafting, and will give brief directions for managing the process; and we shall in due time speak of the other methods of propagating, and give a list of the most approved garden and orchard fruits. From a pretty general acquaintance with fruits, native and foreign, acquired by critical observation for many

years, in our business as a nurseryman, and from being somewhat of an amateur, we venture to say, that nine tenths of our farmers are unacquainted with the choice fruits which the garden yields, particularly of the peach, pear, and plum; and that the best fruits are yet but partially disseminated among them.

April is the general season for grafting in this latitude, though it is sometimes performed in March, and sometimes omitted till May. The grafts should, however, be cut before the buds begin to swell. The scions are most likely to live if inserted when the sap is circulating freely, for then the wounds soonest heal.

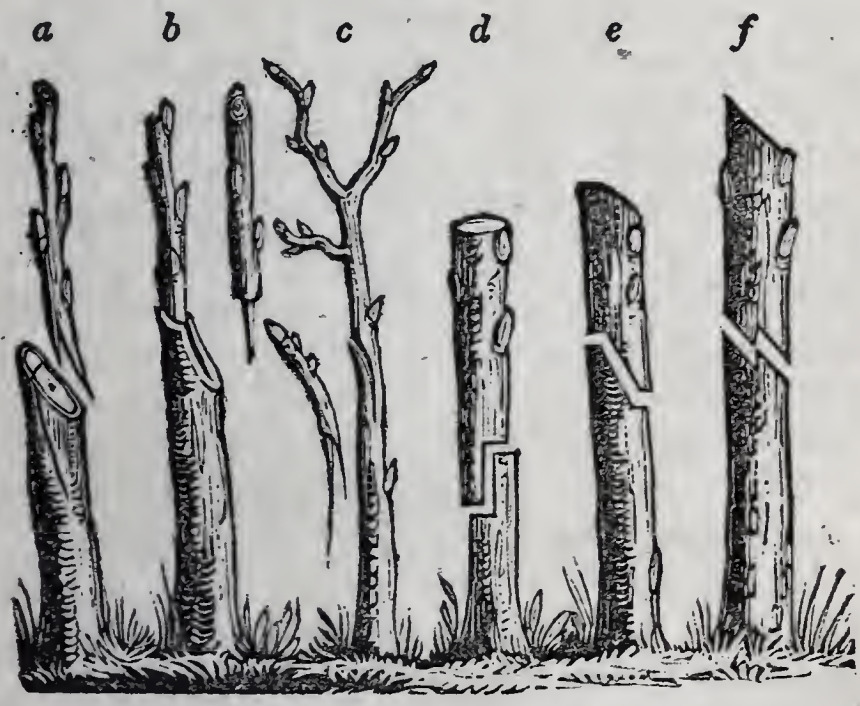
The materials and implements required for grafting are, 1. A sharp knife to cut and pare the graft and stalk; 2. A strong knife and mallet to split the larger stalks, and a small hardwood wedge to put into the cleft while the scion is fitted to its place; 3. Strips of bass matting, or other soft string, to tie around the stalk and graft; and, 4. Some good grafting-wax or prepared clay, to cover over the worked part. If clay is used, it should be previously well beaten, and a portion of fresh horsedung mixed with it during the operation. A grafting-wax, which we have used for years with success, is made by mixing and melting together four parts of rosin, two parts of tallow, and one part of beeswax; the whole to be afterward incorporated and worked by the hand, like shoemaker's wax. This may be applied over the grafted part in a thin layer, or first spread on a cloth and then applied in strips of proper size. The wax or clay is applied, 1. To prevent the extravasation of the sap from the wounds; 2. The too sudden drying of the wood; and, 3. The introduction of rain water into the wound or cleft. It is evident, therefore, that whatever sort of coating is adopted, it should be applied without delay, and so as effectually to exclude air and water.

The object to be aimed at in the process of graft-

ing, is to bring the inner bark and the sapwood of the stalk and scion in nice contact, so that the ascending sap of the stalk will pass freely into the sapwood of the scion, and the descending sap of the scion, which has been elaborated and prepared in the leaves, and which descends through the inner bark, to pass freely into the inner bark of the stalk. This elaborated sap soon hardens into wood, and covers and heals the wound.

There are more than forty different modes of grafting practised by professional nurserymen. We shall only speak of those which are best adapted to the practice of the orchard and garden.

Fig. 1.



Cleft-grafting (fig. 1, *b*) is most practised upon strong stalks, or in heading down or regrafting old trees. There are two methods of doing this: one described in the cut, where the stalk is first cut off obliquely, and the sloped part is then cut off horizontally near the middle of the slope; a cleft nearly two inches long is then made with a sharp knife or chisel, in the crown, downward, at right angles with the sloped part, taking care not to divide the pith. The cleft is kept open by the knife or the

small wedge; the scion has its extremity, for about an inch, cut into the form of a wedge: it is left about the eighth of an inch thick on the bark side, and brought to a fine edge on the inside. It is then inserted into the opening prepared for it, and the knife or wedge being withdrawn, the stalk closes firmly upon it. The other and the more common mode is to saw off the stalk horizontally, make the cleft through its centre, and insert either one or two grafts in the outer edges. In both cases the stalk should be tied and covered with the wax or clay.

Whip-grafting (fig. 1, *a*), or, as it is sometimes called, tongue-grafting, is mostly adopted in nurseries, where the stalks are generally small. It is desirable that the stalk and graft should be of nearly similar size. The scion and stalk are cut off obliquely, at corresponding angles, as near as the operator can guess; then cut off the tip of the stalk obliquely or nearly horizontally; make now a slit nearly in the centre of the sloped face of the stalk downward, and a similar one in the scion upward. The tongue or wedgelike process, forming the upper part of the sloping face of the scion, is then inserted downward in the cleft of the stalk; the inner barks of both being brought closely to unite on one side, so as not to be displaced in tying, which ought to be done immediately, with a riband of bass or other soft string, brought in a neat manner several times round the stalk. The next and finishing operation is to cover the whole wound with the prepared wax or clay already described. The French mode of whip-grafting, which is also in common use here, differs from the English, in their never paring more off the stalk, however large, than the width of the scion (fig. 2, *a b c d*). In both, the stalk is sometimes left a few inches above the graft till autumn, to tie the young shoot to, lest it be blown off.

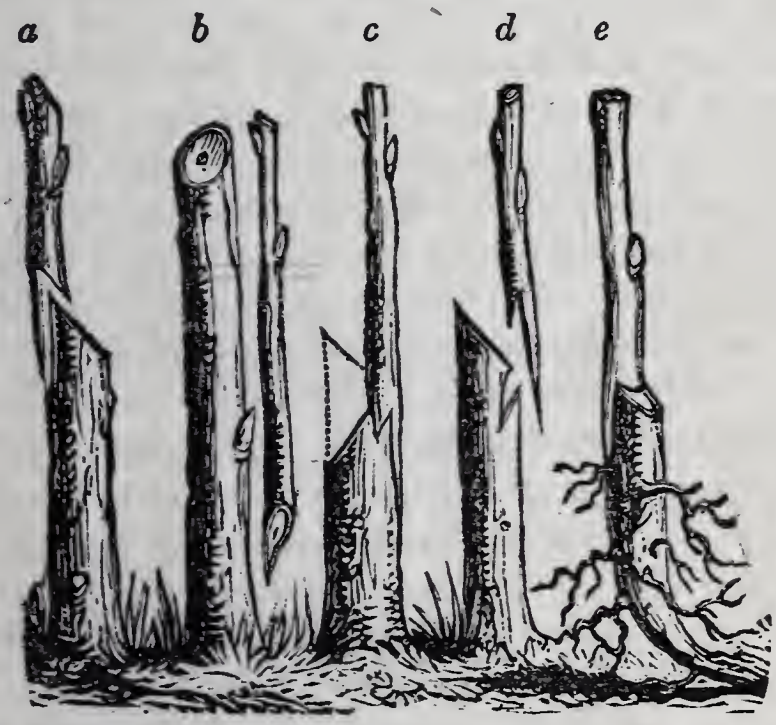
Side-grafting (fig. 1, *c*), resembles whip-grafting,

except it is performed without taking off the top of the stalk.

Shoulder, or chink-grafting, is performed with a shoulder, and sometimes also with a stay at the bottom of the slope. It is chiefly used for ornamental trees, where the scion and stalk are of the same size (fig. 1, *d e f*).

Grafting in the root is sometimes performed in nurseries, where stalks are scarce, as described in fig. 2, *e*.

Fig. 2.



The Garden.—Among the general rules which ought to be regarded in the management of a garden, and which in some measure apply to the management of a farm, we may particularize the following:

1. A garden should be enclosed by a secure fence; otherwise an unruly animal may destroy in a night the fruits of many a day's toil.

2. A garden should be rich; for here the maxim particularly applies, that it is better to cultivate a small piece of ground well, than a large one slovenly and bad. "*Well* done" is the only "*good enough*" for a garden.

3. Do not plant your roots and vines in the shade, or under the drippings of trees, but in an open exposure. Appropriate shaded situations to medicinal plants and herbs. Trees impoverish the ground, and their shade is baleful to most crops. Plant trees upon the north, east, and west borders, where their shade will be but partially prejudicial, or along a main alley.

4. Alternate your crops; that is, do not plant your onions or other vegetables two successive years on the same quarter. This rule is as important to the garden as it is to the farm; and every farmer, at least every good farmer, knows that alternating his farm crops is of the first importance to profit.

5. Plant your seeds when the ground is fresh dug or ploughed, when it is filled with atmospheric air, and moist and permeable to heat, three indispensable requisites to the vigorous germination of the seeds. They will then sprout quick and grow luxuriantly.

6. Seeds require to be kept moist till their roots have got firm hold of the earth, and their leaves have expanded above it. To ensure this, the soil must be brought in close contact with them, and they sufficiently covered. A good precaution is to tread the fresh dug soil on the line where the seeds are to be planted, which retards evaporation from below; or, when the seeds are covered to a sufficient depth, to compress the earth upon them with a hoe, spade, or board, which not only tends to retain the moisture, but to break the soil, and to bring it in close contact with them. Seeds often fail to grow, or, having began to germinate, are dried and lost, for the want of moisture. And many small seeds with husky coverings, particularly flower-seeds, have been declared bad, because they have been planted without due reference to this rule.

7. As soon as the plants are firmly rooted, the more the earth is stirred about them the better. This

facilitates the preparation of the vegetable food in the soil, and greatly promotes growth. Next to the destruction of weeds, nothing counteracts the effects of drought so much, in garden or field, as stirring the surface of the soil.

8. Different seeds require different temperatures to induce germination; and if they are put into the ground when it is too cold and wet, they are liable to rot. Wheat, rye, barley, &c., will germinate at 45°, corn at perhaps 55°, while the melon probably requires a heat of 60 to 70 degrees. The common bean will vegetate in a cold temperature, while the Lima bean will rot in a cold or wet soil. Hence, in planting, regard is to be had to the hardiness of the plant which is to be sown.

The month of May is an important one in the operations of the garden. If not already done, no time should be lost in sowing the seeds of onions, salads, early cabbage, peas, radishes, and in planting some early corn and potatoes. The beet, carrot, parsnip, and summer squash may also be sown. Cabbages for winter use may be sown in time from the 20th to the 30th. As soon as the soil and the season are warm enough to bring up corn, which here is generally from the 15th to the 20th, plant your melons, pumpkins, and cucumbers, though it will do equally well to plant the latter, for pickles, in the early part of June. The 15th will ordinarily do for Lima beans, which are the best of the bean family. Soak the seed of these in warm water a few hours, and cover them slightly when planted. My practice is to save this crop for winter use. They afford a great product. When frost is apprehended the beans are all picked, the unripe ones shelled and dried; and, if soaked before cooking, are nearly as good as when first gathered from the vines. An acquaintance digs a large hole, in which he deposites a barrow of dung, which he covers with six inches of earth, and plants the Lima beans, and

puts down poles upon the border of the manured circle. In this way they are said to grow luxuriantly, and to produce in great abundance. Of the pumpkin, there are several new and much-esteemed varieties, as the Valparaiso, Porter, and acorn squashes. These are rather later in coming to maturity than the old yellow kind, though they have been successfully cultivated among corn. We would commend the planting out, or sowing seeds of parsley, balm, wormwood, tansy, garlic, hyssop, rue, sage, thyme, and other herbs which are often required in a family.—*Ed. Cult.*

If a snug, well-kept kitchen-garden is not an infallible proof of thrift, when seen near a farmhouse, it is a pretty certain indication of comfort and good sense. It shows that the owner is well to live, and intends to live well, so far as his labour and his lands can conduce to good living: for it will not be denied, that the farm and the garden *may* be made to produce, not only the substantials, but a great many of the luxuries of life; we mean those luxuries which, while they are grateful to the senses, neither pall the appetite, vitiate the taste, impair the health, nor corrupt the morals of those who partake of them. Some consider the productions of the garden as constituting a necessary part of human food. So the man of the forest would tell us, that *bread* is an unnecessary article of food; the Abyssinian, that it is unnecessary to *cook* our meat; and many of the inhabitants of Asia would insist, that it is impious to indulge in the use of animal food at all. But as none of these opinions are suited to our age and country, there is no need of combating them. The pleasures and benefits of a garden are so manifest, that none who have once enjoyed them are willing voluntarily to do without them. To have a succession of delicious fruits, plucked at maturity from the trees and vines which one has planted and reared; and to partake daily of

fresh-gathered vegetables from one's garden, the product of his labour, promotive alike of health and pleasure, are no mean gratifications; and yet they are privileges, we are too sorry to say, which, though all *can* enjoy, but few, comparatively, at present, *do* participate in.

Let us enumerate some of the good things, conducive alike to health and innocent gratification, which a garden may be made to produce with very little expense. Perennial products require very little care after they are once established. We will name of fruits, the strawberry (for these will be smothered by the grass on a well-conducted farm), the currant, gooseberry, plum, pear, quince, grape, and, in situations where they will thrive, the apricot and peach. But of fruits we would have none but the best sorts; for the best are as cheap as the worst, are as easily cultivated, and are infinitely more healthy and grateful. These, if well selected, will give a succession of fruit from June to November, and in a preserved state during the year. Plants to begin with will cost from three to five dollars. They may be multiplied by grafting, budding, &c., by the boys or men of the family, without any expense. The trees should be so arranged as to shade as little as possible the grounds that are to be tilled. Half a dozen roots of the pie-plant (rhubarb) will furnish abundant materials for pies and tarts, in no wise inferior to the gooseberry, from April to July, or until the fruit is sufficiently advanced to supply its place. These should be planted two feet apart in good soil. A bed of forty by three and a half feet will supply the table with delicious asparagus during a part of April, and the whole of May and June, if kept in good order. For this the ground should be dug deep and made rich. The seed, which will cost a shilling, should be sown in drills ten or twelve inches apart about the first of May; the bed should be kept free from weeds, and the ground

forked in the spring. The third year it will be fit to cut. Or, roots may be bought at fifty cents the hundred, which will give a crop the second year. Plant them six inches apart in the drills. About two hundred and fifty plants will fill a bed of the given dimensions. Among the perennials, we may also class some medicinal plants and sweet herbs which are useful and necessary in the economy of a family, such as sage, thyme, hyssop, balm, rue, tansy, wormwood, &c., which it requires ten times the labour to beg from more provident neighbours than it does to raise in our garden. The annual products, which go towards subsisting a family and which are seldom produced but in the garden, are numerous, as the onion, beet, carrot, parsnip, cabbage, peas, beans, potherbs, salads, radishes, squash, cucumber, melon, &c. Some of these are in use most of the season, and most of them afford valuable winter stores.

These productions of the garden which we have named, and the list might be greatly extended, are all useful in the economy of a family; they afford a grateful variety, and tend to lessen, in no inconsiderable degree, the quantity of more solid and expensive food which would be required without them; and yet they may all be produced in sufficient quantities for an ordinary family, upon a quarter of an acre of ground, and without seriously abstracting from the ordinary labours of the farm. A garden is truly a matter of economy in a pecuniary point of view; but when we add to this consideration the comfort and pleasure which it affords, we are persuaded we are in the line of duty in commending the subject to the particular consideration of our readers.—*Ed. Cult.*

CHAPTER X.

Household Affairs.

Hints to Housewives.—Vessels intended to contain liquid of a higher temperature than the surrounding medium, and to keep that liquid as long as possible at the highest temperature, should be constructed of materials which are the worst radiators of heat. Thus, teaurns and teapots are best adapted for their purpose when constructed of polished metal, and worst when constructed of black porcelain. A black porcelain teapot is the worst conceivable material for that vessel, for both its materials and colour are good radiators of heat, and the liquid contained in it cools with the greatest possible rapidity. On the other hand, a bright metal teapot is best adapted for the purpose, because it is the worst radiator of heat, and, therefore, cools as slowly as possible. A polished silver or brass teaurn is better adapted to retain the heat of the water than one of a dull brown colour, such as is most commonly used A tin kettle retains the heat of water boiled in it more effectually if it be kept clean and polished, than if it be allowed to collect the smoke and soot to which it is exposed from the action of the fire. When coated with this, its surface becomes rough and black, and is a powerful radiator of heat. A close stove, intended to warm apartments, should not have a polished surface, for in that case it is one of the worst radiators of heat, and nothing could be contrived less fit for the purpose to which it is applied. On the other hand, a rough, unpolished surface of cast iron is favourable to radiation, and a fire in such a stove will always produce a most powerful effect.—*Cabinet Cyclopedia.*

Milk and Smoke House.—I was at old Fort Hunter, on the Susquehannah, above Harrisburg, in 1828. The highly respectable owner of this beautiful sitution, Col. M'Alister, a gentleman of science and refined observation, treated my fellow-travellers and myself with great courtesy, and showed us some household conveniences worthy of imitation, and, among others, his milk and smoke house.

The Milkhouse was built in the northeast side of a slope, near the well, and not far from the mansion. It was composed of stout stone walls, and the roof, which rose six or eight feet above the surface of the ground, appeared to be covered with earth or tile, and was deeply shrouded with the scarlet trumpet creeper (*Bignonia radicans*), then in splendid bloom. The interior of the house, principally under ground, was fitted up with cisterns, in which water stood nearly to the tops of the pans of milk which were arranged in them. The house was entered by a flight of steps on the south, and there was a window on the north, which could be opened or darkened at pleasure, to give ventilation. For want of a natural spring, which many Pennsylvanians consider almost indispensable in a milkhouse, the water was conducted in a pipe from the well-pump, and, after filling the cisterns to a certain height, passed off at the opposite side. The object was to obtain a cool temperature in the heat of summer, which greatly facilitates the separation of the cream from the milk, and this object was amply effected, with the labour of working occasionally at the well-pump.

The Smokehouse was a wooden octagon building, perhaps 16 feet in diameter, perfectly tight except the doorway. The peculiarities of this building were, it was set a foot or more above the ground, and was perfectly dry, and bacon, hams, &c., were kept hanging round its walls all summer, without becoming damp or mouldy, or being injured by flies;

and, in the second place, no fire was admitted into the building, the smoke being conveyed into it through a tube from the outside, where it was generated in a stove.

How to make Tea and Coffee.—Every housewife knows how to make *herb* tea. The herbs are put into a cup or dish, hot water turned upon them, and they are suffered to *steep*—why not to *boil?* Because a large portion of their medicinal virtues, and particularly the principal of flavour, the most volatile property they contain, is dissipated by boiling, and the virtues of the tea lost. In the processes of boiling and fermentation, the natural flavour and aroma of the choicest vegetable productions are dissipated or changed. Yet, though every woman knows how to make herb tea, few seem to know how to make *green* or *black* tea, or *coffee;* or, knowing, do not reduce their knowledge to practice. A mistaken economy, to *get all the strength*, induces them generally to *boil* the latter *well*, and often the former; and the consequence is, that, instead of a grateful, refreshing beverage, they give us a dull, acrid, or insipid substitute, retaining nothing pleasant but the colour and heat. The aroma, which gives to the liquor its value, and which should be recognised by the nose as well as the palate, is gone —*with the steam*—and with it much of the flavour. They not only *boil out* the strength, but they *waste* it. Now, without intending to infringe upon the prerogatives of the good wife, we *do* advise that she will make her green and black as she does her herb tea, *without boiling;* and that she will only *leach* her coffee, by putting it, when recently burned and fresh ground, into a strainer, fitted to the top of her coffee-pot, and turning upon it as much boiling water as would suffice in the old mode. We can assure our fair readers, from reason as well as experience, that this *is* the best way, not only to gratify the taste, but to promote economy. Less tea and coffee are

required in the steeping and leaching than in the boiling process, and the beverage obtained by the mode recommended is more tonic, exhilarating, and pleasant.

Hints to Housekeepers.—A writer of your paper of the 7th ult., over the signature of Sylvanus, has offered excellent advice for curing bacon, and insists that the hogs for this purpose must be cornfed. How long must they be so fed is the question.

Experience has shown that it requires but a very short time to entirely change the flavour and texture of all kinds of flesh. In 1770 I resided in New-Jersey, where it was the custom to take great numbers of wild pigeons in springnets, by the assistance of decoy pigeons prepared for the purpose. The flesh of these birds, when first taken, is always very dark, and most generally tough. I have seen more than 300 of them confined and fed in a large cornhouse, and in one week their flesh has not only become tender, but as white as a wellfed chicken.

In 1784 I promised to present to a brother just married a prime beef towards his winter stores. I had a fine steer and a spayed heifer in a large wheatfield abounding with white garlic; my brother named a day to send for his beef, and three days previous we killed the heifer, which, although extremely fat, was, to my great disappointment, so thoroughly tainted with garlic, even to the marrow in the bones, that my house-servants refused to eat it; a bad prospect for my brother, whose wagon came the fourth day; and, in despair, I killed his beef, which was beautiful to the eye. I did not at the time pay much attention to a remark of his feeder, who observed that the steer had not eaten anything since the heifer was killed; my trouble was the certainty of my brother's disappointment; but, to my great joy, I soon received his letter of thanks, saying that a more juicy, tender, and fine-flavoured beef could not be.

The foregoing facts are known to every experienced farmer, and they have convinced me that hogs fed upon corn for two weeks is much better than two months, for the plain reason that the flesh is equally good and the expense is less.

Hogs, as generally managed, are not only the most troublesome, but the most costly flesh we consume; and I have for many years been in pursuit of a plan to lighten the cost of their flesh, which is so absolutely necessary for the establishment of every Marylander. I flatter myself that I now see my way clear; for, after two years' trial, I am well satisfied that the use of cymblins, pumpkins, ruta baga, and clover will enable me to send more corn to market, and, with two weeks feeding upon that precious grain, my bacon will not yield to that of any person. No branch of rural economy requires more attention than feeding our various kinds of stock. Our northern friends laugh and say, that in Maryland the hogs eat all our corn, and our negroes eat all our hogs. This is too true to deny; and if my mite can, in your opinion, be of any use to the public, it is at your service.—*American Farmer.*

To have good Yeast in summer is a desirable object with every housewife. She may have such by the following simple process:

Boil a single handful of hops (which every farmer can and ought to raise, to the extent of household wants, in two or three quarts of water; strain and thicken the liquor, when hot, with rye flour; then add two or three small yeast or turnpike cakes, to set the mass. If this is done at evening, it will be fit for use early next morning. Reserve a pint of this yeast, which thicken with Indian meal, made into small cakes, the size of crackers, and dry them in the shade for future use. In this way the yeast is always fresh and active. Yeast-cakes kept a long time are apt to become rancid and lose their virtues. The fresher the cakes the better the yeast.

To boil Meat.—Let the following rules govern. After the water begins to boil, it should be kept boiling till the meat is cooked. Put the meat into cold water, sufficient only to cover, and to keep it covered during the cooking process. More water than this renders the meat less savoury and weakens the broth. The water should be heated gradually, according to the thickness of the article boiled: the larger the piece of meat, the more moderate should be the fire. If the water boils before the meat is heated through, the latter will be hardened, and shrink up as if it were scorched. The slower it boils, the tenderer, plumper, and whiter it will be. Fresh-killed meat requires longer boiling than that which butchers call ripe, and is, withal, more tough and hard.

CHAPTER XI.

Miscellaneous Articles.

Improved System of Bee Management.—There is no branch of rural economy connected with more agreeable associations than that of bee management. The proverbially industrious habits of the insect, and its extreme ingenuity in the construction of its domicil and the deposition of its treasures, are such as to excite the admiration of the most unobservant. The common necessity of destroying the stock, in order to obtain the produce of their labours, has been always matter of regret. Many plans have been hitherto devised for the purpose of obtaining the honey without the destruction of the bees, but they have only been attended with partial success. The object has, however, been

latterly and more perfectly attained by Mr. Nutt, a practical apiarian of Lincolnshire, whose system of management has given this branch of rural economy an importance and value of which it was not before considered susceptible, both in the greater productiveness of the bees and the much superior quality of the honey.

The first part of Mr. Nutt's plan of operation is to leave the hive into which the stock is introduced untouched. When it is filled with honey (the contents of which are to be reserved for the use of the bees), the capacity of the hive is increased by the addition of another box to the side, communicating with the hive by apertures, which give free admission to the bees in all parts of the box.

The next important object in Mr. Nutt's system, is to ensure a regular and uniform temperature in this portion of the hive, without diminishing the temperature of that which contains the stock. The ventilation necessary for this purpose is effected by the means of a perforated tin tube, extending down to a considerable distance from the top into the hive, and connected with an aperture at the bottom, which may be partly or wholly closed by a tin slide, thus modifying the circulation of the air and consequent degree of temperature. The temperature of this side box, which is indicated by a thermometer introduced into the tube, ought to be 70°, which is the natural temperature of the working hive; but in that which contains the stock, a temperature of 90° is necessary, as well for the incubation of the queen bee as the maturity of the young. The parent hive is, then, as well the residence of the queen bee as the nursery of the young, while the side boxes are but additional storehouses for the reception of the superfluous honey, which may be taken away without impoverishing the stock or robbing them of their winter sustenance.

When the thermometer placed in the side box

rapidly rises to 90° or 100°, the necessity of again providing the bees with fresh room is indicated; and this is effected by establishing another box on the opposite side of the hive. The bees, finding an increase of room, will readily recommence their labours in this new apartment.

Then follows, in Mr. Nutt's system, the operation of separating the bees from this second hive. This is effected by the ventilator, by which the internal temperature of the hive may be reduced to that of the external atmosphere; and when, on the approach of night, the bees, recoiling from the cool air, go back into the middle box, the connexion between the two may be closed, and the full hive withdrawn, without the imprisonment or destruction of a single labourer. The same arrangements are to be again renewed as the bees continue their successful labours. In this system no provision is made for swarming, which cannot occur under this arrangement, the emigration of a part of the stock being only occasioned by a want of room in which the bees may pursue their labours.

The honey furnished under this system of management is found to be far superior, both in quality and quantity, to that obtained under any other arrangements. The honey and wax are as white as refined sugar. This superiority in quality it owes as well to the modified temperature at which the bees secrete their products, as to its total exemption from all extraneous animal and vegetable matters, and, in particular, from the pollen or bee-bread, which is taken in considerable quantities into the stock-hive for the support of the young. This superiority of the honey is only equalled by the quantity of the supply: the usual annual supply from one stock is about one hundred weight of honey: while, in the course of one season, Mr. Nutt has produced the large quantity of 296 pounds. This increase in quantity is owing to the excellent

disposition of the arrangements, by which the industrious efforts of the bees are never retarded, nor their strength weakened at the time when the fruits and flowers most abound from which their treasures are obtained.—*Penny Magazine.*

Having entered my name for premium on honey and on hives of bees, I will inform you how I have managed them for a few years past. I keep them in boxes; my boxes are thirteen inches square on the outside, and from six to seven inches high, with thin slats across the top about an inch wide, with just space enough to let the bees pass between them. For a young swarm, I fasten two boxes together with a board on the top, put in the swarm, and, when I set them on the bench, put under as many more as I think they will fill; a large early swarm will fill four or more. I had some this season that filled three in about a fortnight, and then swarmed, and the young swarms have filled four boxes. After my old hives have swarmed once, I usually put under one or more boxes. I prefer that course to letting them swarm again, for second swarms are generally worthless. When the weather becomes cool, if the hive is well filled with honey, the bees will all leave the upper box, and it can then be taken off without disturbing the bees in the hive. I usually take from my old hives and early swarms one box, containing from twenty to twenty-four pounds, and leave enough for the bees to live on through the winter, or I can take a part and return the box if I think the remainder is insufficient for them. If my bees grow lazy after the swarming season is over, and hang out on the hive, which is in consequence of the hive being full, I add more boxes. I had a few small swarms which I have taken up otherwise. I have not destroyed any bees. I have taken up on my own farm this season 289 pounds of good honey in the comb, and I

now own, including those that I have taken up, twenty-six hives.

Maple Sugar.—The first care should be to preserve the trees. It is not safe in primitive woods to cut away all the other timber and to leave only the maple standing. In this way they are robbed of their protection, and are very liable to be prostrated by the wind. But trees growing in open situations adapt their forms to withstand the winds; and hence those which are termed second growth ought to be carefully preserved. Trees are often destroyed in a few years by injudicious *tapping*. We have seen them half girdled in a season in order to increase the sap. The consequence is, that the wounds do not heal; the water lodges in the *boxes* and rots the wood, and the tree dies or is broken off by the wind. A chisel and mallet are better than the axe to *tap* with, and a screw auger, two to five quarters in diameter, according to the size of the tree, is better than either, as the wound then soon closes and little or no injury is inflicted on the tree. One or two holes may be bored on the south, and the like on the north side of the tree, if the size will warrant it. The holes at first should not exceed three quarters of an inch, and the slope upward should be so much that the sap will run freely in frosty weather, and not, by a slow motion, be liable to freeze in the mouth of the orifice. When the flow of sap begins to slacken, the holes may be increased to the depth of two and a half inches, or the depth of the sap or whitewood, and with an auger a quarter larger than was first used. The spout should not enter the hole more than half an inch; as the farther it enters the more the running sap is obstructed. In ordinary seasons, the best time for making maple sugar is the last twelve days in March and the first twelve days in April. It must freeze at night and thaw in the day to constitute good sap weather. A west wind is most favourable.

The next object is to preserve the sap clean, and to do this it is necessary to have clean vessels for its reception. The old way was to use troughs roughly cut from timber previously split through the centre. These answered tolerably well the first year. But, being suffered to remain under the trees, they were often found, when wanted the next year, filled with leaves, ice, and filth, which unavoidably mingled with the sap. The best vessels for this purpose are wooden buckets, made broader at the top than at the bottom, that they may be packed away in nests, under cover, when the sugar season is over, and thus be preserved clean. We have seen them sold at $8 per hundred. They will last many years.

It is found beneficial to put into each half barrel of sap a spoonful of slacked lime. This causes the impurities to rise better when boiling, which should be carefully skimmed off. The sap should be boiled before fermentation commences, which will happen, as the weather becomes warm, the second or third day. The greater the exposure of the surface to the atmosphere when boiling, the greater will be the evaporation. When the sap has been reduced to sirup, it should be strained through a woollen or hair cloth, and then stand a few hours to settle; after which it should be turned carefully off from the sediment which has settled at the bottom. In *boiling down*, charcoal is the best fuel to use; for although the heat should be pretty brisk, it should be equable and be confined to the bottom of the kettle. The *clarifying materials* should be added at the commencement of this process. These are generally milk, eggs, or, what is better, calves' blood. The scum which rises should be carefully taken off. The impurities attach to these mucilaginous materials, and are carried with them to the surface.

When the sirup is sufficiently reduced and taken

from the fire, it should be stirred well for some time, in order to give it *grain*. This is effected by bringing every part of the mass in contact with the atmosphere; for, if turned into moulds immediately, and not stirred, it will not be grained, but resemble candy rather than sugar. If intended to be caked, it must be turned into moulds before cold. Under the best process there will be a portion which will not granulate, on account of the vegetable mucilage which it contains, but which will drain off if the cask in which the sugar is deposited has holes at its bottom through which it can pass. To prevent the sap or sirup rising, a piece of fat may be thrown in, or the inner rim of the kettle rubbed with a piece of fat pork.

Molasses and vinegar are generally made from the last runnings, as the sap is then less adapted for sugar, abounding more in mucilage as the buds of the tree swell and being more liable to ferment. The molasses, when properly clarified, is superior to that from the sugarcane, having a peculiarly grateful flavour. The vinegar, though excellent for ordinary use, is not so well adapted for pickles as that made from cider.

Claying or whitening the Sugar.—To promote the molasses passing more freely from the sugar when draining in the moulds or tubs, and to improve its colour, in two or three days after the moulds or tubs are unstopped at the bottom, mix white clay with water so as to reduce it to a thin mortar; with this cover the top of the sugar one inch and a half thick; when the covering appears dry, remove it, and supply the place with a fresh covering about two inches thick. This process may reduce the sugar one fifth, but will add correspondingly to the molasses.

The Orchard.—The most usual practice has been, so far as our observation has extended, to prune fruit-trees in March or April; but it has been recommended by some to omit this work till May, till

after the leaves are out; and by others, still farther to postpone it till the last of June or beginning of July. Against March and April pruning it is urged that the wood, where cut, is liable to crack, through the influence of the drying winds of those months, and being unprotected by foliage, that the sap is apt to exude and waste, and to corrode the lips of the wound; and that, *at this season*, the efforts of nature to heal the wounded parts are feeble. May pruning has been objected to for the reason, that as at this time all the organs of the plant are in active operation, and the growth more vigorous than in any month of the year, pruning cannot but be prejudicial. The sap-vessels are at this time full, and the sap pushing with great force to the extremities; and if the branches are materially diminished, the sap will force itself out near where its flow has been stopped, in numerous shoots, useless for fruit and unsightly to the eye. Those who have pruned at this season can judge what force there is in these objections. Most of our trees, and particularly fruit-trees, have two periods of growth in a season, the first principally in May or June, and the other towards autumn. Between these two periods, their growth is, in a manner, quiescent. This is declared by many to be the best period for pruning; because the second growth suffices to cover the lips of the wound, or, when small, the wound itself, with new wood and bark; and, in the second place, because the volume and force of the sap are then so much diminished, that few shoots or spray are thrown out. We have tried the different seasons, and are of the opinion that the last-mentioned time has a decided preference. For three successive years, we have pruned our orchard after cutting an early crop of grass, say the middle of July, and have witnessed none of the evils which have resulted from autumn and spring pruning.

We recommend to the cautious orchardist to do

as we have done: try the three methods, and hold fast to that which does best. Experience is the best school in which to gain instruction, and it is the only school in which most of us are willing to learn.

We will give but three rules in regard to the operation of pruning an orchard, and they will be short ones.

Prune annually. If judiciously done, none but small branches will be required to be cut, and the wounds of those will soon heal.

Make a clean cut, and pare smooth, with a sharp knife, the edges of the wound. This will greatly facilitate the healing procees, and preserve the tree from decay.

When the habit of the tree will allow, take out the leading shoot at the height where you design to have the branches spread. A horizontal branch will produce more fruit than an upright one.

The best application that we have tried (and we have used it to advantage six or seven years), to kill bark-lice upon the apple-tree, to destroy larvæ of other insects, and to give a clean, healthy appearance to the tree itself, is a *strong* ley made of wood ashes or potash. It is applied to the boll or trunk of the tree, and branches if necessary, with a brush nailed or tied to a stick a yard or more in length. The most suitable time to make the application is between the middle and last of May.

There are advantages and disadvantages in tilling an orchard. In tilled ground trees are the most vigorous and thrifty; and it seems to be, in a measure, necessary to plough a few years to give the young trees a start. Yet, even at this period, great care is required not to cut the roots with the plough. But when the trees have acquired six or eight years' growth, and the roots become extended, still greater precaution is necessary, or the injury becomes serious. It is not altogether the large roots that are so liable to be cut, for these are often below the

plough, but the innumerable fibres that spread in every direction, which escape the ploughman's notice, but which are literally the mouths that take up the food for the plant. Our practice has been, when an orchard is to be ploughed, to proceed first to dig the ground superficially with the spade about the tree two or three feet in breadth, and as many yards lengthwise of the furrow, so that there shall be no balk, and to run the plough shallow near the dug part: and, where the orchard is in grass, to dig circles round the trees after harvest, both to facilitate growth and to prevent injury in winter from moles. There is no less caution necessary in using the spade than the plough, to preserve the roots entire. It is a good practice to cut the grass close with a hoe, and then to strew rotten chip-dung, if mixed with a little lime the better, about the tree.

Field Culture of Beans.—Beans may be cultivated in drills or in hills. They are a valuable crop; and, with good care, are as profitable as a wheat crop. They leave the soil in good tilth. The China bean, with a red eye, is to be preferred. They ripen early, and are very productive. I cultivated beans the last year in three different ways, viz., in hills, in drills, and sowed broadcast. I need not describe the first, which is a well-known process. I had an acre in drills, which was the best crop I ever saw. My management was this: On the acre of light ground, where the clover had been frozen out the preceding winter, I spread eight loads of long manure, and immediately ploughed and harrowed the ground. Drills or furrows were then made with a light plough, at the distance of two and a half feet, and the beans thrown along the furrows about the 25th of May, by the hand, at the rate of at least a bushel on the acre. I then gauged a double mouldboard plough, which was passed once between the rows, and was followed by a light one-horse roller, which flattened the ridges. The crop was twice cleaned of weeds by

the hoe, but not earthed. The product was more than forty-eight bushels, by actual measurement. The beans brought me one dollar the bushel last fall. The third experiment was likewise upon a piece of ground where the clover had been killed. It was ploughed about the first of June, the seed sown like pease, upon the first furrow, and harrowed in. The drought kept them back, but about 65 rods of ground, on which the experiment was made, gave a product of twelve and a half bushels. The crop was too ripe when it was harvested, and as it was cut with a scythe, I estimated that about two and a half bushels were left upon the ground. No labour was bestowed upon them from the time they were sown till they were harvested.

Budding.—The effect of propagating choice fruit about a farmer's premises is, figuratively, to grow the rose where only grew the thorn, and, literally, to provide for one's family and friends some of the choicest luxuries of life; and these luxuries far surpass those of a like kind which are purchased with money, because upon one's own trees they may be permitted to attain their highest perfection, and because they are rendered more endearing by the personal care and labour which we bestow on their culture.

We now proceed, agreeable to our promise in the second number of the Cultivator, to describe the mode of propagation by budding. This mode has several advantages over grafting. It is more readily performed, with fewer implements, less preparation, and with greater success; it does not injure the stock if unsuccessful, and the operation may be twice or thrice repeated the same year, as the season for its performance is protracted, for some one or other of the varieties, for some three months. Although July and August constitute the ordinary season for budding, the plum and the cherry may often be budded in the latter part of June, and

the peach, apricot, and nectarine as late as the middle of September. Youth may readily acquire the art, by little practice, under the directions we are about to give; and we know a young lady who is an adept in it, and who practises it annually as a pleasant recreation, as well as a useful labour. We have often been treated with delicious peaches produced by the buds which she had inserted.

The first consideration is to provide stalks, if this provision has not already been made. Seeds may be collected the coming season in almost every family. Those of stone fruit may be mixed with earth, or deposited in a hole in the garden, and in the autumn buried superficially in the earth, to expose them to the expanding influence of the frost; and in the spring those of the peach and plum that have not burst the shell should be cracked, and the whole sown in a well-prepared seed-bed. The cherries may be sown immediately after they are taken from the fruit, and the apple, pear, and quince either in autumn or spring. All the kinds will generally grow the first season. If transplanted in June, and well treated, the peach will do to bud in September following, and the others in two and three years, if put into nursery rows three feet apart, and a foot distant in the rows, and well taken care of. The same rule applies to plants as to animals: the better condition they are kept in while young, the more profitable they will become at maturity. Thus two or three roods of ground will suffice a farmer for a nursery of choice fruit, from which he may replenish his orchard and his garden at pleasure, and readily appropriate to his use every new variety which comes under his observation. No one will regret the trifling labour and attention which he has bestowed on a little plantation of this kind, after he has began to realize the fruits of it. Ornamental shrubs and trees, to embellish the

grounds about his buildings, may be added without cost and with trifling labour.

A bud is an organized plant in embryo, with roots, branches, and foliage, and, like a seed, possesses individual vitality capable of development and the reproduction of its species. The process of budding is the transferring this embryo plant from its parent tree to another tree, which must at least be of the same genus, if not of the same species. The apricot and nectarine may be, and generally are, budded upon the peach; the plum and the peach are budded on each other, and the pear and apple may be worked on the wild crab and hawthorn; and the former is put on the quince to produce dwarf trees. To render the transfer or budding succesful, three things are requisite; 1. That the bud be in a proper condition to transfer; 2. That the stalk be in condition to receive and nourish it; and, 3. That the transfer be skilfully made. The bud ought to be matured, i. e., of full growth, and yet not so hard and firm as to cause injury in separating it from its parent. The stock must peel freely, as this is necessary for the insertion of the bud, and indicates the presence of what is termed the cambium, which is the soft, partially-formed woody matter which underlays the bark, which will ripen into indurated wood; is the source of nourishment to the bud, and the bond of union between it and the stock. The operator must use precaution that he injures neither the bud, the bark, nor the cambium, as these all exercise important offices in effecting the union; and he must withal take care to apply his ligatures properly. It will be seen, from these remarks, that both the stock and the graft should be in a state of active growth, and the more vigorous the better, when the budding process is performed. It is also preferable to bud when the weather is cloudy, but not wet. Twigs for budding may be preserved for many days with care. They should

be immediately divested of their leaves, but not wholly of their leaf-stocks or petioles, to prevent the exhaustion of moisture, and may then be wrapped in fresh grass, wet cloths, or with their butt ends preserved in moisture.

Fig. 1.

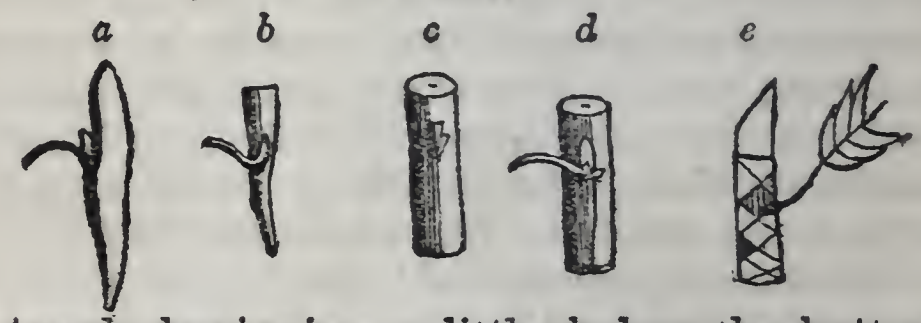
The only implement necessary is a budding-knife (fig. 1), and the only preparation some bass matting, or the inner bark of the basswood or linden.

Professor Thouin enumerates twenty species or varieties of grafting, most of which are only practised by amateurs and professional gardeners. We shall describe only the common mode, which is in general practice in nurseries. We take it from the Encyclopedia of Gardening.

"*Shield-budding*, or T budding, is thus performed: Fix on a smooth part of the side of the stock, rather from than towards the sun, and of a height depending, as in grafting, on whether dwarf, half, or whole standard trees are desired; then, with the budding-knife, make a horizontal cut across the rind, quite through to the firm wood; from the middle of this transverse cut make a slit downward, perpendicularly, an inch or more long, going also quite through to the wood. This done, proceed with all expedition to take off a bud; holding the cutting or scion in one hand, with the thickest end outward, and, with the knife in the other hand, enter it about half an inch or more below a bud, cutting nearly half way into the wood of the shoot, continuing it with one clear slanting cut about half an inch or more above the bud, so deep as to take a part of the wood along with it, the whole about an inch and a half long (*a*, fig. 2); then directly with the thumb and finger, or point of the knife, clip off the woody part remaining to the bud; which

done, observe whether the eye or germe of the bud remain perfect; if not, and a little hole appears in that part, it is improper, or, as gardeners express it, the bud has lost its root, and another must be prepared. This done, placing the back part of the bud or shield between your lips, expeditiously with the flat haft of the knife separate the back of the stock on each side of the perpendicular cut clear to the wood (*c*), for the admission of the bud, which directly slip down, close between the wood and bark, to the bottom of the slit (*d*). The next operation is to cut off the top part of the shield (*b*) even with the horizontal first-made cut, in order to let it completely into its place, and to join exactly the upper edge of the shield with the transverse cut, that the descending sap may immediately enter the back of the shield, and protrude granulated matter between it and the wood, so as to effect a living union. The parts are now to be immediately bound round with a ligament of fresh bass (*e*), previously soaked in water to render it pliable

Fig. 2.



and tough, beginning a little below the bottom of the perpendicular slit, proceeding upward closely round every part, except just round the eye of the bud, and continue it a little above the horizontal cut, not too tight, but just sufficient to keep the whole close, and exclude the air, sun, and wet.

"*Future Treatment.*—In a fortnight, at farthest, after budding, such as have adhered may be known by their fresh appearance at the eye; and in three weeks all those which have succeeded well will be

firmly united with the stock, and the parts being somewhat swelled in some species, the bandage must be loosened, and a week or two afterward finally removed. The shield and bud now swell in common with the other parts of the stock, and nothing more requires to be done till spring, when, just before the rising of the sap, they are to be headed down close to the bud, by an oblique cut, terminating about an eighth or quarter of an inch above the shield. In some cases, however, as in grafting, a few inches of the stalk is left for the first season, and the young shoot tied to it for protection from the winds."

Experiment on Feeding Calves.—Long and careful observation has convinced me that cows give more milk through the season to take their calves from them the first or second week. Calves, with kind treatment, will usually, in two or three days, learn so as readily to drink the milk when presented to them, but they require about one fifth more milk when fed to them; probably the saliva they swallow in sponging the milk from the teat may account for the difference, but they learn to feed on grass or fodder younger, and their food may more gradually be changed from milk to other feed, than can conveniently be done with a suckling.

Calves suddenly taken from a liberal supply of milk to grass, are frequently affected with a diarrhœa that sometimes proves fatal.

"I must acknowledge that I have been prejudiced against making any substitute for milk for the first ten or twelve weeks with any expectation of raising a thrifty animal, till last year, 1834, I had two heifer calves dropped the 4th of May; anxious to raise them, although of our common breed, but their dams were excellent milkers, I determined to try to raise them on whey. When they were four weeks old, I began to mix whey and a small quantity of shorts of wheat with their milk, and gradu-

ally lessened the quantity of milk till they were five weeks old, and stopped the milk and fed them whey three times a day, and at morning and evening mixed a single handful of shorts for each calf with the whey, at noon fed the whey alone. We sat the whey in a clean vessel in a cool place, where it would not sour, for evening, warming it to near animal heat. In the morning, fed the first whey dipped from the cheese, and when about ten weeks old, one of them was killed by accident: to the other we fed shorts till it was three months old; after fall feed was good, we fed her whey twice a day for a time, and then once a day as long as we made cheese. In the winter, besides hay, she was fed a single handful, about two thirds of a gill of flaxseed, mixed with a pint of wheat bran, twice a day; did not feed her any higher, as she was in as good flesh as was desired. She is now the largest heifer of her age in the vicinity; is as large as my two-year-old heifers that had a liberal supply of milk for the first ten or twelve weeks, and much more grain the first winter.

"This year, 1835, we have fed two calves in the same manner; one of them has had no milk since it was twenty days old; it was in as good flesh, but I think did not grow as fast for two or three weeks as it would on milk: they are doing as well as the one last year. I think they are now gaining of some calves in the vicinity that run with their dams.

"From the above observations I have drawn the following conclusions:

"1st. That a calf may be raised well on less than half the milk required to fatten it; that if they do not grow as fast for two or three weeks, they will gain it in the latter part of the season, and be better in the fall than those fed in the usual way.

"2d. That the feed of calves should not be changed suddenly from a liberal supply of milk to

grass, as it would not be very dissimilar to forcing a plant forward in a hotbed, and then transplanting it into the open air, when the temperature is but above freezing.

"3d. That it is more profitable to feed whey to calves than to hogs.

"4th. That the practice is inexcusable of slaughtering calves and throwing their flesh to the hogs, because their milk will fetch more in cheese than the veal will for the table. If the Creator had given us liberty to destroy the lives of his creatures thus wantonly, the flesh of the swine thus fed must be unwholesome food. The fluids and flesh of carnivorous animals, or such as feed on flesh, are highly charged with acrid particles, which may strictly be termed poisonous. It is believed that nothing but extreme hunger will induce one carniverous animal to eat the flesh of another, except that dogs kept on vegetable food have sometimes been eaten by wolves; and it is believed that the flesh of dogs thus fed would be less deleterious than pork fed on flesh; pork thus fed should be prohibited from being sold for food, as it is calculated to produce the most virulent disorders, such as putrid fever, cholera, &c.

"M. R. PORTER."

Earthing Plants.—The benefits sought for by ridging are in some measure obtained by earthing plants, that is, the plants are less liable to be incommoded by water, and a greater surface is exposed to the ameliorating influence of the sun and atmosphere; but then, it must be confessed, that serious injury is likely to ensue from cutting and restricting the range of the roots, and the waste of manure incident to the earthing process, particularly where the plough is employed, as it usually is. We have made this the subject of experiment and observation for some years, and the conclusion we have come to is, that upon our sandy soil there is neither field

nor garden crop, save potatoes, that is benefited by being earthed up, if the ground has been properly prepared, and the surface is kept clean and open by the cultivator, harrow, or other implement; and that even the potato crop should be only earthed up at the first dressing. Earthing plants, as Lorain observes, is not imitating nature, whose teachings constitute our best guide. The most plausible reason urged for this practice, except what we have intimated at the commencement of this paragrph, is, that it affords a bed of fine pulverized mould for the roots of plants to range in for their food; but if the ground is well prepared and drained, and the surface kept loose, this labour is seldom necessary. While, on the other hand, the disadvantages of the practice are manifest. We will illustrate this in the corn crop. When this receives its last dressing, it is usually from three to five feet in height, and we assume it as a fact, of which we have had ocular demonstration, that the roots at this time, unless they have been already shortened by the plough or hoe, are of greater length than the tops; or, in other words, that they occupy the whole ground. Now supposing the hills to be four feet apart, it gives to each hill four superficial feet of soil to thrive upon. If you run a plough twice between the rows one way, you reduce this four square feet of pasture, at least until the roots can be elongated, to three feet; and if you plough your corn both ways, you reduce it to two, or one half, and this, too, at a time when the grain stands most in need of an abundant supply of food. Nor is this all; nature has ordained, and she will in this be obeyed, that plants shall have surface roots to imbibe the benign influence of the atmosphere, and when those which she provides are buried under a load of earth, she will provide new ones; and every earthing which we give to our corn and potatoes causes a new growth of surface roots, at the expense of the crop. Besides, droughts

operate far more prejudicial to hilled crops than they do to those which are not hilled.

The potato, according to our understanding, has two sets of roots, which perform entirely different offices for the plant; the proper roots, which take the unelaborated food from the soil, and the stollens, or fruit-bearing roots, which receive the elaborated food, and convey it to the tubers. The first are protruded as soon as the seed germinates, the latter not till the plant has made most of its growth. The first strike down obliquely; the latter shoot horizontally, and repose near the surface. The object of earthing is to furnish a bed permeable to the stollens, and which will give readily to the pressure of the expanding tubers. The hill may be formed when the seed is deposited; but as the soil is apt to become compact, it is better to form it later, but before the stollens and tubers have formed; for if the plant is earthed after these have begun to form, a new set of stollens is thrown out near the surface, the tubers upon which seldom attain to full size. Hence a late earthed crop is likely to abound in small potatoes.

CHAPTER XII.

Miscellaneous Articles—Continued.

Things a Farmer should not do.—A farmer should never undertake to cultivate more land than he can do thoroughly: half-tilled land is growing poorer, well-tilled land is constantly improving.

A farmer should never keep more cattle, horses, sheep, or hogs, than he can keep in good order; an animal in high order the first of December, is already half wintered.

A farmer should never depend on his neighbour for what he can, by care and good management, produce on his own farm; he should never beg fruit while he can plant trees, or borrow tools while he can make or buy; a high authority has said the borrower is a servant to the lender.

The farmer should never be so immersed in political matters as to forget to sow his wheat, dig his potatoes, and bank up his cellar; nor should he be so inattentive to them as to remain ignorant of those great questions of national and state policy which will always agitate more or less a free people.

A farmer should shun the doors of a bank as he would an approach of the plague or cholera; banks are for men of speculation, and theirs is a business with which farmers should have little to do.

A farmer should never be ashamed of his calling; we know that no man can be entirely independent; yet the farmer should remember that, if any one can be said to possess that enviable distinction, he is the man.

No farmer should allow the reproach of neglecting education to lie against himself or family; if knowledge is power, the beginning of it should be early and deeply laid in the district school.

A farmer should never use ardent spirit as a drink; if, while undergoing severe fatigue and the hard labours of the summer, he would enjoy robust health, let him be temperate in all things.

A farmer should never refuse a fair price for any thing he wishes to sell. We have known a man who had several hundred bushels of wheat to dispose of, refuse 8*s*. because he wanted 8*s*. 6*d*., and after keeping his wheat six months, was glad to get 6*s*. 6*d*. for it.

A farmer should never allow his woodhouse to be emptied of wood during the summer months; if he does, when winter comes, in addition to cold fingers, he must expect to encounter the chilling

looks of his wife, and, perhaps, be compelled, in a series of lectures, to learn, that the man who burns green wood has not mastered the A B C of domestic economy.

A farmer should never allow his windows to be filled with red cloaks, tattered coats, and old hats; if he doos, he will most assuredly acquire the reputation of a man who tarries long at the whiskey, leaving his wife and children to freeze or starve at home.

There are three things of which the man who aims at the character of a prosperous farmer will never be niggardly, manure, tillage, and seed; and there are three things of which he never will be too liberal, promises, time, and credit.—*Genesee Farmer.*

Farm Buildings and the Consumption of Fodder.—Among all the deficiencies which exist in the perfect management of our farms, I am sensible that none are more prominent than that of proper buildings. Not that I would advocate expensive or large buildings, but those of ample size and convenience for all the *legitimate* uses of the farm, and of such shape and construction as shall conform to strictly economical calculations.

For instance, I would not build an expensive *stone* barn on my farm, when one of wood, equally good for all ordinary purposes, can be erected for a sum not greater than two or three years' interest on the cost of the stone one; because a well under-pinned wooden building, where extraordinary warmth and tightness are not required, will endure at least fifty years, and need shingling no oftener than a stone building. So of stables, sheds, outhouses, &c. But not so of dwellings.

The desire of warmth with which human beings are sheltered, forms a prominent part of the comfort and usefulness of life, and, therefore, all dwellings should be built of the best materials, and con-

structed in the warmest manner compatible with the ability of the owner. I have much doubt whether the occupant of an open, badly-built house, does not pay three times the annual interest of its cost, in the extra fuel and labour consumed to keep its inmates comfortable; and among no class of people have I found so great an inattention to these very important matters as among our moderate farmers; and when the annual losses by disease, exposure, extra labour of obtaining and preparing fuel, and of time in various ways, all arising from a cold and comfortless house, are taken into consideration, I am thoroughly satisfied that a great portion of the profits of a whole family's industry are annually lost by the wretched houses they occupy.

The great fault committed by most farmers in their buildings, is in the great size of their dwellings. Many who build calculate to do it *within themselves;* or they get out their own timber, draw their own saw-logs to the mill, if there be one near them; quarry and haul their own stone, &c., &c., and so manage as to hire but a portion of their mechanic work, turning in their own labour, and that of their sons and hired men, if they have them, to assist in its erection. This is as it should be; but the difficulty is that they often plan too largely, calculating on finishing off only a small portion of the house *at present*, and to do off the rest at some future opportunity of more leisure and convenience. But these future opportunities of leisure and convenience rarely occur; and so much more capital is often expended in the enclosing of a large dwelling than had been anticipated, or is at all useful to the family, that it remains for ever unfinished, and a cold, comfortless receptacle for them, when a snug, warm, and delightful dwelling could be entirely finished, with every requisite comfort for a numerous family, at the cost of the unfinished shell! How painfully true is this fact in numberless instances.

This fatal error oftentimes extends itself to the outer buildings of the farm, alike prejudicial to all descriptions of stock kept upon it, and of most serious account in the year's results of its products. Fortunately there is so little intricacy or science needed in the construction of farm buildings, that even the least skilful may erect comfortable and necessary shelters for all his domestic animals; and materials abound so plentifully in our country, that they are everywhere to be found. It is better even, in my estimation, for a farmer to sell a small portion of his land, to accommodate the remainder with proper buildings, if he cannot do it otherwise, for he is actually richer in the end to do so; as for the most of them, the produce on an equal number of those acres would be annually wasted for the want of them, besides all the discomfort, misery, and suffering caused by exposure to the inclemency of the seasons. This may be unpleasant argument to those who are intent upon nothing but increasing the extent of their farms, regardless of the comforts and profits of their stock. Yet such, were they to pause in their acquisitions, and, by the erection of necessary buildings on their farms, secure more effectually its products, would in a short time accumulate much more rapidly than before. I name these facts with more emphasis, because I am well assured, by my observations throughout the country, that the want of necessary and proper buildings is the greatest drawback our farmers experience in the profits of their labour.

Of what avail is it that I reap fifty bushels of wheat, or a hundred bushels of corn to the acre, and lose one third of it for want of shelter, or waste in feeding? Unless I can secure my crop, my profit in growing it is of small account. If I cut fifty tuns of hay, and, by exposure in stacks to the weather, only forty of it can be eaten by the cattle, and one quarter part of that even is trampled under foot, I

had better have had only thirty tuns of good hay in my barn, and even then my stock would have consumed five tuns less by being warmly housed for the winter. This is a view of the case which I think must strike every thinking mind, and will apply itself to every kind of domestic animal on the farm. To my mind it has been most strikingly presented by a year's experience, and I am of opinion that the difference in the consumption of food for the domestic stock of a farm, taking in all the losses incident to the forage itself by want of housing, &c., is at least *thirty* per cent., compared with the most economical method of expending it, and in some cases even *forty* or *fifty!* I am aware that this calculation will strike the reader with surprise, and by many it will not be believed; but to such I only say, try it, and he will become satisfied of its truth.

In the spring of 1834, the management of a large tract of land coming under my charge, portions of which had for years been most miserably mangled by a horde of squatters, who had cut, haggled, and worked the land after their own fashion, although abundantly productive by nature, I found it in a most miserable condition, requiring immediate care and attention. Numerous wretched log-cabins were scattered over it with bark roofs; an occasional shed for cattle, with a parcel of old rails thrown over the top, and on them the remains of an old stack bottom, where their hay, stalks, or straw had been stored, were all the buildings or conveniences to be found on the premises. Three or four of these little squads or settlements had been made on different parts of the territory, and each one comprised within its compass from one to two hundred acres of this partially-cleared, girdled, and dilapidated improvement. Having got rid of the squatters, and selected one of these settlements most conveniently located for immediate operations, and taken the best cabin, well situated and convenient for a dwelling, I put into it a good

family, fit to manage the place, built an addition to it also of logs, put on a good shingled roof, and, with a hundred or two dollars' expense, made a very comfortable affair of it. With sufficient help on the place, the fences were straightened and put into line, the old bouks (*bocks*), brush fences, logs, &c., &c., cleared up, and tolerable crops got in. Having come into the place about the middle of April, it was too late in the season to make rapid advances; but in the course of the summer perhaps 30 acres of oats, 5 or 6 of corn, and as many of potatoes, were cultivated and yielded a tolerable crop. A dozen acres of wheat were also sown in the fall, and perhaps 70 or 80 acres of land worked into tolerable shape for another season. Yet we had no barns nor the means of building any during that year; one wretched log stable, which stood near the house, was all that we had for shelter to any of our animals, and with that we shifted to get along. Our hay, of which we had some 60 or 70 tuns cut from a distant clearing, our oats, corn, fodder, &c., &c., were all stacked out in the open air. Winter came upon us. With a few thousand feet of boards and the aid of crotches and poles, we made some sheds and mangers for our cattle, of which we had a large stock, composed of oxen and cows, and erected some racks in the yard to feed them in. By these means we got through the winter after the fashion. Our cattle had enough to eat, and during the cold weather looked tolerably well; but as the cold rain and snow storms of March and April came on, they grew poor in spite of all we could do. Food enough to keep in high condition double their number, if well housed, was given to them, but all to little purpose. The storms wet the fodder in the stacks, the cattle trampled it into the mud under their feet, and with all the care given them, which was a great deal, I am fully satisfied that at least 25 per cent. of the food given them was entirely lost.

And yet this was better and more economical feeding than one half the stock of our country get on the average! It may be a bold and sweeping remark, but it is nevertheless a *true* one, and would every farmer make the experiments who thus practises, he would fully test its correctness. We had great labour to perform, and therefore submitted to the loss and inconvenience accruing to this mode of management. During the winter we cleared up more of this *slashed* ground, enclosed it, drew off its wood and timber, and last spring had perhaps 200 acres of pasture, mowing, and plough land ready for use. We were now ready to build a barn, and, after the spring crops had been put in, proceeded to erect one proper for the uses of the farm. It was soon built, covered, and enclosed, and by haying and harvest time was ready for use. It was placed on a central and convenient spot for the farm, which is a large one, and although this barn is 100 feet long, by 50 feet wide, and 18 feet posts, with leantos for stables on each side of it, with a floor 14 feet wide lengthwise through the centre, more room will soon be required. It was a matter of much wonder and inquiry by my neighbours who saw the barn, of what possible use it could be, supposing it a most extravagant building, although for the size a very cheap one. Yet, when we had cut and stored our hay, oats, and wheat, the barn was crammed full to the roof, on the floor and all. We housed everything; all was put in, in perfect order and good condition. Ample room is there made to tie up every animal to be fed, and not a lock of hay or spoonful of grain need be lost. The manure is all saved, and in a convenient situation to be carried out, and a degree of economy, comfort, and satisfaction experienced in spending the food to the stock, that amply compensates for all the extra expense. The hay and grain it contains is more than 150 tuns, enabling us to feed out every bundle of straw and coarse fodder,

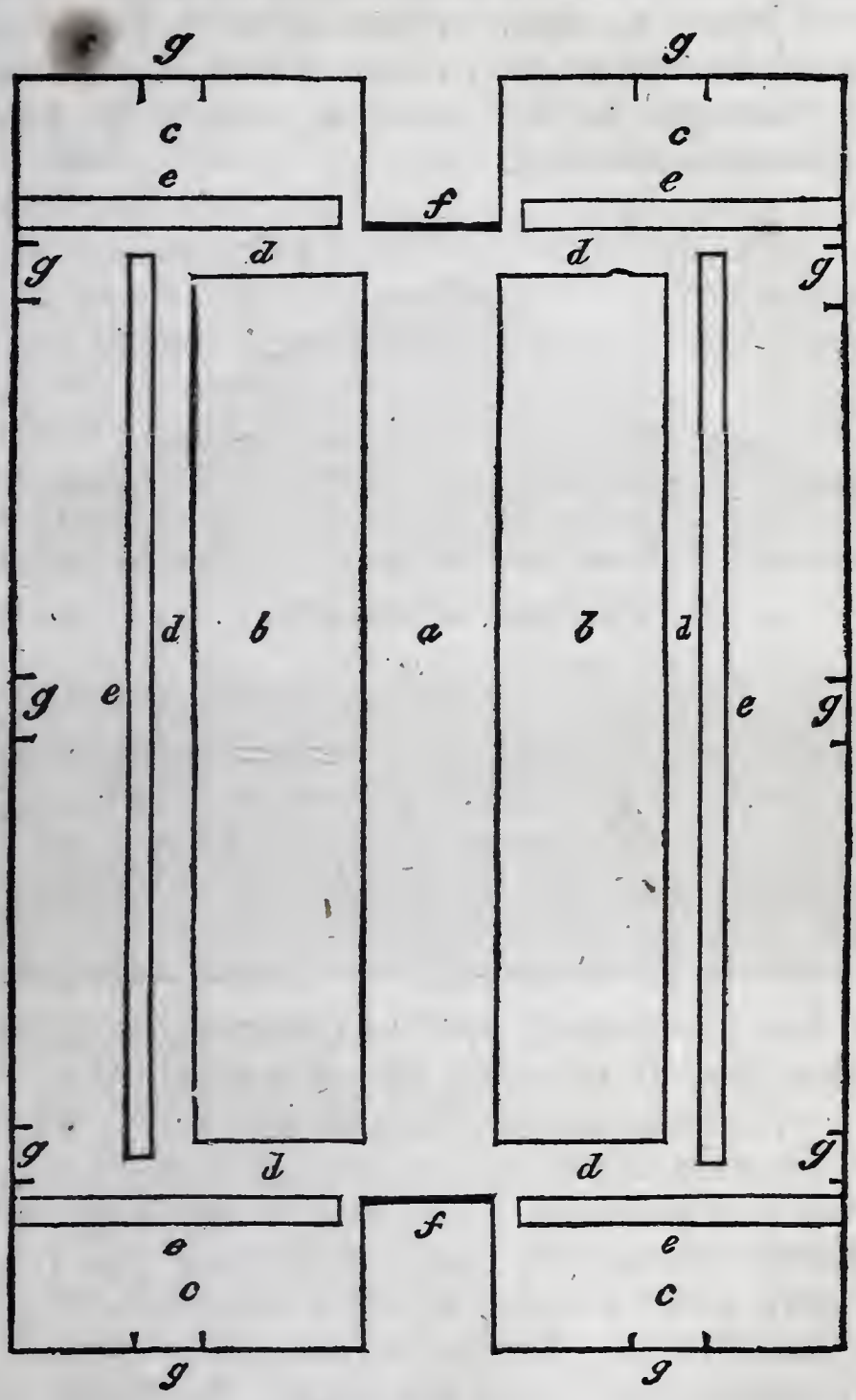
which is in most cases altogether lost or only used for manure: a plan of this barn is annexed.

There are so many collateral subjects connected with the barn and other outbuildings of a farm, that it is hardly possible to give an essay on this subject without discussing the different methods and economy of feeding stock, with the preparation of the food, preservation of manures, &c., &c. But as the *principle* of feeding is the same in all kinds of neat cattle and horses, it will apply to all cases. In the first place, I hold that there is no straw, corn, fodder, or grass cut on a farm, with the exception perhaps of the straw of pease, beans, and buckwheat, but what may be consumed as *food;* therefore all reasonable pains should be taken to secure them in good order and have them well stored and sheltered for winter food. How many thousand tuns of valuable wheat-straw have I annually seen in our wheat counties thrown out from the thrashing-mills, and piled up year after year to rot and taint the atmosphere with its offensiveness, when it might all be made into the best of food for cattle, by being housed and chopped with trifling labour! It appears with many farmers to be a matter of no sort of consequence *who* feeds the stock or *how* they are fed, provided they are only fed at all; not considering that there is equal economy in spending the food as in securing it. Look at the season of haying and harvest among our farmers. What preparation for toil and incessant labour, increase of help, high wages, &c., &c. Up by daybreak in the morning, and at work, and no rest till dark. It is the extraordinary season of the farmer, when everything is sacrificed, even the Sabbath oftentimes, to toil, and no cessation till it is all over. But when the winter comes on, this invaluable food, collected at so much cost and toil, is expended with a heedlessness and prodigality unaccountable to any rational or thinking mind. This indeed may seem foreign from the

subject of which I am treating, but it is too nearly allied to it to be lost or overlooked.

My own method of feeding is to cut *every* kind of straw, and even the coarse marsh or meadow hay, in the cutting box, and mix it with a light portion of shorts, bran, or oatmeal, just enough for the cattle and horses to eat it. In this way they consume everything. Nothing is lost; for what they leave is taken from their mangers and mixed over again with the new mess. It is the exclusive business of one man to cut the food, clean the stables, and feed the cattle; and, if he needs assistance, he has it. By this means he becomes acquainted with the appetite and health of each animal, a matter altogether important. If they be out of health, or need extra nursing or attention, he knows it and provides for them. A change of food is occasionally given, and by this operation all is relished and eaten perfectly clean. We now feed about 40 yoke of oxen, 8 or 10 horses, a dozen cows, some sheep and young stock, all in this manner, though not all in one building, without any waste at all. Everything is saved. Every animal is tied up in its place excepting the sheep, and each has its own portion without fear or molestation. I well know that they consume less food per head by thirty per cent. than they did during the last winter, when they were fed nearly, if not quite equal to the ordinary method practised throughout the country. Our oxen, I am satisfied, perform more labour, the cows yield more milk, and all the animals consume less food by being thus housed and attended. But to the plan of the barn. It is here given.

Ground Plan.

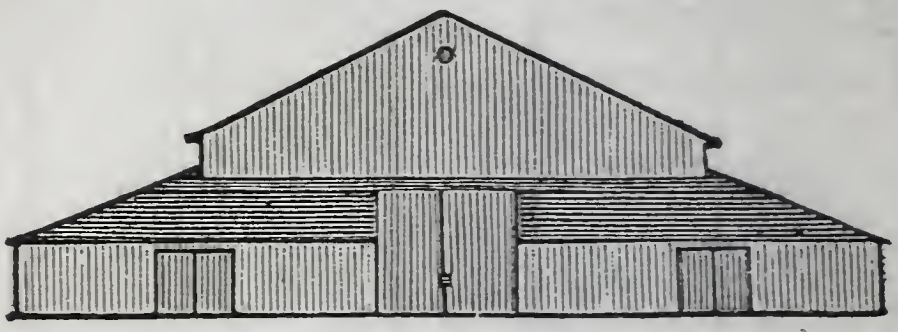


Explanation.

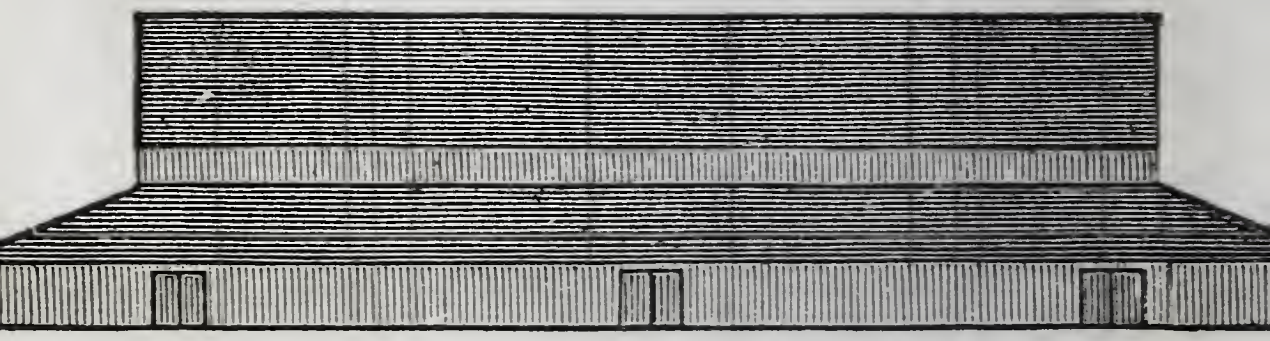
a, Barn floor, 14 feet wide. *b b*, Bays for hay and grain, 18 feet wide, and 92 feet long. *c c*, Stables for cattle and horses, 13 feet wide in the clear. *d d*, Passages to stables, 4 feet wide. *e e*, Mangers for feeding, 2 1-2 feet wide. *f f*, Great doors, 14 feet wide. *g g*, Stable doors, five feet wide, double.

Length of barn, 100 feet. Width of barn, 50 feet. Posts of barn, 18 feet. Pitch of roof, 12 1-2 feet. Height of leanto posts, 7 feet. Pitch of stable roof, 8 feet. Length of side leantos, 100 feet. Length of end leantos, 38 feet.

Upright—End View.



Upright—Side View.



The barn is framed as if to stand alone, omitting the lower girt at the ends on each side of the large doors. The leantos are then framed on to the barn in the simplest manner, the passage being *round* the main body of the barn, excepting at the ends, where the passage is *in* the main barn, and the leantos there only 16 feet wide, and the manger is fitted up to the main barn. Only one passage is made to go into the short stables at the ends. Stalls are made 7 1-2 feet wide, and boarded between, and each ox or cow is tied next to the partition side of the stall, which prevents their getting together, and saves much room. The doors are sufficiently wide to drive in a pair of oxen yoked, and large spikes are driven in the plates all round the stables to hang harness, yokes, and chains upon.

The bottoms of the mangers are raised ten inches from the floor, and laid double. The sides of the stable are also battened with thin boards inside, which makes them perfectly tight and warm; windows, with sliding shutters, are made in the sides to throw out the manure.

Girts run parallel with the main floor in the posts, across which are laid poles, nine feet above the floor, on which hay or grain can be piled up to the peak.

This barn will hold 200 tuns of hay, and 46 yoke of oxen, or 100 cows or horses. If only ordinary stock is kept, the *long* leantos need be only 18 feet wide, and the short ones 14 feet. Granaries can be partitioned off from the bays or stables as may be convenient. If a thrashing-machine is used, a part of the stable can accommodate it. Its whole expense, finished complete, is about $1500.

On this model barns of any size may be built, and I am well satisfied that, according to the room required, it is altogether the *cheapest* in cost and simplest in construction of any plan I have seen. If a less proportion of stable-room be needed, it may be omitted where convenient.

The passages round the ends of the bays, and in front of the mangers, are for feeding the cattle, everything being put in front of them. The passages are wide enough to carry hay, and when the bay is partially fed out, the hay may be thrown directly into the passages.

I would on no account store hay or other material over the cattle, under the stable roofs, although there is considerable room, as I am satisfied from experience that there is none too much space left for ventilation.

The floors are lined with thin refuse boards, excepting a part of the stables, it being my wish that *nothing be lost.*

This barn is placed on level ground, having no

side hill convenient on which to place it. I would prefer, if possible, a sloping piece of ground, and make an ample cellar beneath it to receive the manure, preserve roots, &c., &c. It will add to the expenses of building, but greatly to the convenience and economy of the farm.

This, it is true, is on a larger scale than is needed for an ordinary farm; yet many farms require as much and a larger quantity of barnroom. If everything be saved and housed that can be profitably expended in the feeding of stock, much more shelter is required than is supposed. If the farm be small, the size of the barn should be graduated to its wants. This plan has been closely examined by many farmers of great experience, and pronounced to be the best they have seen. The utmost possible economy of room is made for packing the hay and grain, and the stables are mere leantos, made of light frame, attached to the sides and ends of the main building. If wood covering, for either the sides or roof, of boards and shingles are not to be obtained, they may be made of thatch. The bodies of the building may even be laid up of logs, and covered with slabs, so that they be well chinked and comfortable. It is true that there is some waste room over the cattle in the stables, but no more than is wanted for ventilation and to pass off the respired air, which is deleterious to their health. The letting in of fresh air, in cold and stormy weather, through the sides of the building, gives them colds and diseases, to which they are as liable as the human family. But even if only sheds are wanted, I am satisfied that they are better to be attached to the sides of the barn in the way these stables are, than in any other, being more convenient, and allowing the stock to be fed in them with greater economy. The stables attached to this barn being for the accommodation of working cattle mostly, are wider than need be for an ordinary

stock, and may be made narrower. But among all other plans, I have found none which combine the requisites of cheapness, economy of feeding, and storage like this. It has, withal, an appearance of snugness and comfort about it that greatly embellishes the farm.

If sheds are wanted in addition, they can be attached to the stables, and run off in either direction, and accommodated with racks or mangers as may be required. But every domestic animal on the farm should be fed at the barn, with the exception of sheep, which require, if kept in large numbers, a different and separate course of management. The custom of stacking hay or grain in the field is, at best, a bad one, and, if resorted to, it should be removed to the main barn as soon as the cutting season is over, or there is room in the barn to receive it. Small moveable barns are frequently built to store it in, and from them fed to cattle during the winter; but this, in the best of weather, is accompanied with waste, particularly in the manure, which is valuable even on the best of soils. It is, besides, much less labour to carry the hay either on sleds or wheels to the barn, and then feed it to the stock, than to go daily two or three times to fodder it out. So much has been said and written on the wasteful method of feeding at stacks, that at this time it is almost superfluous to mention it.

As to the other ordinary outbuildings to the farm, it is only material that they be conveniently and economically built. No farmhouse should, however, remain without a swillhouse, with a large caldron set in brick, an ample woodhouse, wagon, and toolhouse, corncrib, &c., near by. As to the dwelling, it is a matter of fancy with many, and to those who have the ability, provided they make it comfortable and convenient, it matters little what is the shape, size, or style of it. Still there is a model that I consider cheaper and more convenient than almost any

other, and for those landholders and farmers who build for the accommodation of their tenants, I consider it a most excellent one to follow. I am about building one on a farm of my own for the manager to live in, sufficiently capacious to accommodate his own family and half a dozen hired men. Its whole expense will not exceed a thousand or twelve hundred dollars, and, if opportunity offers, I may send you the plan in some future communication.

L. F. ALLEN.

Hotbeds, we are aware, are very little employed by farmers; yet many would employ them, we believe, if they were aware of their advantages, and knew how to construct and manage them. The expense is trifling. They are employed to raise early salads, early cabbage-plants and cucumbers, and to bring forward plants of other garden products, as tomatoes, egg-plants, flowers, &c., and which may be transplanted into the open ground as soon as the season will permit. By means of hotbeds, under ordinary management, salads may be had for the table in April and May, cucumbers in May and June, and cabbage and other plants in May, or earlier if desired. There is no specific rule for making a hotbed, yet we will give such directions as will enable those who wish to make an experiment of their use.

The first thing is to obtain, say three sashes, which are usually about six feet long by three feet four inches broad. They consist of a stout frame made of plank, with five longitudinal astragals or strips for the glass to rest upon, without any cross-pieces, so that each sash will contain six strips of glass, six inches broad, which lap slightly, to throw off the rain. These are the most common form, though the size is not material. Whatever may be the size of the sash, a frame, generally made of plank, must be provided to fit two or three of them, with strips running from front to rear for the sash

to slide upon. The frame may be 14 to 18 inches high on the back side, and about 7 inches less in front, so as to give the glass, when on it, a slope nearly at right angles with the rays of the meridian sun. Having thus a frame and sashes, lay down the former in the place designed for the hotbed, mark out a space extending round the frame from 8 to 12 inches, and take out the earth from the enclosed space to the depth of 12 to 15 inches deep, and fill this with unfermented horsedung, separated and equally distributed with a fork, and raise the dung at least 18 inches above the surface of the ground. Put on to this the frame and the glass, and in a short time a rapid fermentation will take place. In two or three days the dung may be covered with four or six inches of good earth, and if cucumbers are intended to be planted, a hole should be made in the manure under each sash of four or six inches for the hills, that the depth of earth may be ten or twelve inches. Whenever the violence of the heat has sufficiently subsided, which will be in two or three days more, seeds may be planted, which will appear above ground in 24 to 48 hours. Care must be takeh to raise the upper ends of the sash occasionally, to let off the heated air, and to draw them partially down, after the plants are up, when the weather is mild, and to cover the glass with a mat when it is cold and during a meridian sunshine, to protect the plants from frost and too much sun. The middle of March or first of April is early enough to prepare a hotbed for plants designed to be transplanted into the open ground.

Destructive Insects.—Not only thorns and thistles, but hosts of noxious insects, have been inflicted on degenerate man. My attention has been chiefly directed against the latter evil.

The character of some of these insects will be described in treating of my warfare against them.

The first in my series is, probably, of American

origin, as in no system of entomology can I find a description of the insect which has proved so destructive to our peach-trees. I have to rely on my own observation for its history and description. It was probably unobserved by us prior to the present century.

In the autumn of 1800, I first saw the fatal malady in the peach-trees about Philadelphia; the next year it had reached Burlington, and thence continued its march northward, about twelve or fifteen miles a year. In 1807, in a choice collection of fruit of my own, every tree had the premonitory symptoms of the yellows; a few miles north escaped that year. Having made a careful dissection by splitting and barking several trees, I could discover no cause, but ravages of the worms between the bark and wood. Collecting a number of the worms, I confined them in glasses, and hatched from them the perfect insect; a moth or miller, small in comparison with the worm; white or light gray, with dark spots, wings convolute, like a section of a crow-quill split longitudinally. This phalena or moth lays its eggs on the leaves of the peach-tree; when hatched, the larva or maggot subsists itself first on the leaf, until it has acquired sufficient size and energy to migrate to a more suitable and permanent home for the winter: this is between the bark and wood of the tree, near the ground. Here it enlarges its domicil; a sickly state of the tree follows; and, if they congregate in sufficient numbers to circumvent the tree, certain death is the consequence, by intercepting the communication between the root and body of the tree.

The larva of the peach insect is herbivorous, and in this state of existence subsists on the tender lining of the bark; living in a cleanly manner, it deposites all filth outside the door, by the dark, powdery appearance of which its abode may be detected. In its chrysaloid state, its appearance is

smooth and glassy. It frequently happens, when seeking these worms, a chrysalis very different is found; this is the sirex or tailed wasp, the natural enemy of the peach-worm; the sirex is a restless, fidgety insect, resembling a wasp; its young, like that of other wasps and hornets, is carnivorous. It may be observed about the neighbourhood of the peach-worm's habitation, at the door of which it lays its egg: the product, a worm, creeps into the bowels of the peach-worm, feeds on its carcass, and occupies its coat. Its chrysalis, unlike that of the peach-worm, is rough and filthy, caused by the sweat and writhing of the victim of its rapacity.

I have been thus particular in noticing the sirex, because, being a usurper of the abode of its foster parent, it has been falsely accused of being the mother of mischief, instead of a friendly ally which should be patronised. Among others, the Sussex (N. J.) Register had, about six years ago, a belligerant article against this supposed enemy.

Knowing that, even in a moderate degree, *heat* proves fatal to the cut-worm, I was led to try its effect on the peach-worm; having placed several in the hollow of my hand, I found that water not uncomfortable to my skin killed them. I thence commenced applying boiling water from a watering-pot (without the nose), pouring it round the tree, about eighteen inches above the ground, in sufficient quantity to heat the bark; the quantity was varied according to the thickness of the bark and the size of the tree; this proved completely successful for several years, and as long as it was continued. The time for using the heat was the last of summer, and again the middle of the autumn, lest some might have escaped or more recently arrived.

The Pea Bug.—This may also be an American insect; we hear nothing of it abroad, and imported seed is without it. Its march through our country

preceded that of the peach-worm about twenty-five years, and, in like manner, travelled from south to north about ten miles a year. This insect is too well known to need a description. It lays its eggs on the half-grown peapod opposite each grain; the maggot, when hatched, penetrates the pea, the skin closes over, and it extends itself to a large size, but contracts into the pupa state to one side of the pea, from whence emerges in the spring the perfect bug, ready to perpetuate its species.

To counteract this evil, I have in my garden sown imported clean seed, seed two years old, containing no live bugs, or I have scalded infected seed with equal success; that is, the crop was but partially infected, and that I imputed to the proximity of the garden of my less careful neighbours.

These insects would be eliminated from our land if everybody would scald their peas on the day of sowing them; this is easily effected. The farmer may put two bushels into an open flour barrel with one head, pour on them one gallon of boiling and half a gallon of cold water mixed; cover the cask a few minutes; this would produce heat enough to kill the bugs, and would facilitate the germination of the pease.

I have not been able to ascertain the parentage of the insect that attacks the young fruit of the apricot, plum, and other smooth-skin stone fruits. Its attacks are probably made in the early morning (a time not particularly propitious to my habits of investigation); formerly I gratuitously considered it a winged insect; it makes a couple of wounds, as if by pincers, in the skin of the fruit, in which it deposites an egg; the larva or maggot from this eats to the centre or stone, injures the fruit, and causes it to fall prematurely: afterward the larva penetrates into the earth to winter there; in the spring it works its way to the surface, to renew a similar round of existence for its progeny. In the middle

of my garden were two apricot-trees, bearing abundance of fruit, but not one perfect. I removed the surface, and formed an area around each tree similar to the gravelled walks; from these I had the fallen fruit removed daily to the piggery; after this, I had plenty of good fruit. Near to these trees was a nectarine and several plum-trees, which, not being on my boundaries, were not treated in like manner; they produced no sound fruit. It would thence appear that the insect may not be winged or migratory to much extent, but may belong to the order *aptera*, wingless, and probably of the genus *phalangium*. Of these there are several species, all less and of shorter limbs than the well-known *father long-legs*; I know one variety with claws like a crab, capable of inflicting the above described wounds; they escape observation by their light colour and slow movements. Other means than those I pursued for the protection of these fruits. I have often seen narrow strips of sheepskin, wool on, fastened around the body of the tree before the blossoming season, and continued during its ripening. In the absence of these, rolls or bats of coarse wool might answer the purpose against these crawlers, if such they may be. A still better security may be obtained by planting this kind of fruit-trees in a yard where pigs and poultry could have free access during the fall of their fruit.

The Cut-worm.—This is the offspring of the *phalena devastator*; wings horizontal; white, with small dark spots; under wings orange; conceals itself from the sun during the day; lays its eggs near the root of grasses. These worms are of a bluish colour, and they travel only in the night; they cut off young cabbages, beans, and corn; the latter is injured but not destroyed by them. To shun its depredations in gardens, be careful to plant at a distance from any grassplat or lawn. I have lost an entire crop of late-planted beans by them, by plant-

ing near a grassplat. Frequent superficial hoeing in the middle of the day, by exposing to the sun, proves fatal to many of them.

Another familiar enemy is the *turnip-fly*. I have witnessed many a crop of cabbage and cauliflower plants, also melon and cucumbers, destroyed by these minute insects. To obviate this, on the first-mentioned small seeds being sown, I have wetted the ground to the depth of an inch or more with boiling hot water, thus destroying the flies and their eggs, and, at the same time, expediting the germination of the seed. For melons and cucumbers, I sow and rake in radish or turnip seed, on and around each hill; the flies are attracted by these, their more favourite food, from the melons, &c. Against the striped bug, another destroyer of melons, a brood of young chickens is a sufficient protection for a whole garden.

Mr. Editor.—I do not presume to think the above the only or best means of abating the evils we suffer from insects; my object is rather to elicit from others the result of their observation and experience; the subject, in my view, is important. Has any one, more fortunate than myself, discovered the insect, for insect it most probably is, that produces the deforming warts and threatened destruction of our plum-trees? A knowledge of the agent might lead to the means of counteracting its influence. May we not hope that some means may be discovered for palliating the impending evils from the wheat insect by fires or smoke of some offensive kind, as of horns or hoofs of animals, made in the evenings, at a particular stage of the opening ear. Many remedies, and some of much practical utility, have been suggested against the Hessian fly. We ought not to submit to, or look lightly on, these pests. Ants, insignificant as they appear in our view, have been suffered to multiply to such an extent on the Island of Grenada, that a

premium of £20,000 sterling has been offered from the public treasury for the best plan for their destruction. Poison and fires are employed.

Let us exert our energies against the whole race of these *destructive insects;* let us devote a few hours each year to this warfare, and although we may not gather laurels, we shall assuredly reap a rich bounty. SENEX.

Kinderhook, March, 1835.

CHAPTER XIII.

Miscellaneous Articles—Continued.

[*Pine Plains.*—Large districts of our country bear this denomination. Their intrinsic value for agriculture is daily becoming better appreciated; and under improved management, with the aid of the clay marl which generally underlays them, they promise soon to be among our most profitable lands. The following judicious remarks, on the proper mode of cultivating these lands, on "frequent ploughing," and on "natural meadows," although written for Saratoga, have a general application, and cannot but be read with profit by all who cultivate sandy lands. They are extracted from a geological survey of Saratoga county, written by Dr. *Steele*, of Saratoga Springs.]

The method which should be pursued with this soil, in order to obtain the greatest possible profits, seems to be agreed, among the most experienced farmers, to be the following: First crop, winter wheat; second, Indian corn; third, barley, oats, spring wheat, or rye, with which grass-seed should be sown (clover and timothy is preferred), and the

whole ploughed or dragged in at the same time. Experience has likewise given currency to the belief that the *roller* is a very important implement in seeding sandy soils. It should be employed immediately after the seed is put in. This renders the surface compact and smooth, and gives a depth and firmness to the roots of the young plants, that they do not possess when the seed is strewed over the surface, as is the usual custom; and, besides, it is supposed to protect it very materially against the effects of the winter.

On the following season the clover is to be well plastered, and the crop mowed for hay: the next season it should be again well strewed with plaster, and it then may be fed until the latter part of August or the beginning of September; at which time it is to be turned over with the plough, and prepared for a future crop of grain. Wheat succeeds well, but there is some contrariety of opinion as to the mode of putting in the seed; the usual practice is to cross-plough and break up the sod before the seed is sown; but those who have practised it think the crop succeeds best when the seed is sown on the top of the furrows, and for this purpose the earth, after being well turned over, is rolled and merely harrowed. The seed is then sown and dragged in with a light harrow, or ploughed in the way of the furrows with a very light plough, but not so as to disturb the sod.

Some farmers, who have not made themselves acquainted with the use of the roller, have adopted the following method: they simply turn over the sod, and then cast the seed immediately on the top of the furrows; but it is obvious, that passing a roller over the surface, and then a light harrow, would have the effect to fill up the interstices of the furrows, and render them more even for the reception of the seed; besides, it would render the earth more compact, and press it more closely to the

green crop turned under, and this is considered very essential in order more readily to perfect its decomposition, and thereby render it subservient to the growth of its successor, for which purpose it is buried.

Many farmers prefer Indian corn instead of wheat on the sod, and some difference of opinion exists as to the propriety of turning over the sod in the fall, or in the spring immediately before planting. It should always be turned over in the fall, before it has ceased growing, and in the spring after it has pretty well advanced.

It seems to be agreed on all hands, that three successive crops are all that should be attempted before the field be again seeded, and the same rotation of crops be pursued. Under this course, the quality as well as the quantity of the produce will annually improve, and an increase of fertility be constantly added to the soil.

This soil would receive great and lasting improvement from the transposition of the marl which lays at the bottom to the surface. This would give more tenacity and consistency to the soil, and prepare it more effectually for the benefit of the vegetable manure, which is to be supplied by frequent seeding. With this dressing, all those sandy hillocks, which are blown about like snowdrifts, might be reclaimed and converted into ornamental as well as profitable appendages to the farm.*

The practice of clovering and plastering has been

* Some years ago I published a paper on the existence of marl in this county and its application as a manure; but I have yet to learn whether any use has ever been made of it.

The Agricultural Society of this county have this year (1822) awarded a premium of $6 to Gilbert Waring, of the town of Saratoga Springs, for the best experiment with marl (I believe there was no competition). He applied it to some light sandy knolls, which were so poor as to be incapable of produ-

resorted to, and is in general use for the purpose of improving the soil; and it is universally acknowledged to be by far the cheapest and best method hitherto adopted. Much complaint is, however, made of the liability of the clover to be killed out during the winter; but several distinguished practical farmers speak with confidence, that if the seed be ploughed or well harrowed in, and then well rolled, this evil will no longer exist. Covering the seed when it is sown is in practice with some farmers, and the effects resulting from it justifies the procedure; but the roller, so far as my knowledge extends, has seldom been used on these soils, although it has been resorted to, and, indeed, is in general use with some of the farmers on the loamy soils, where its good effects have not been denied by any.

The idea of rendering the earth "*mellow*" for the reception of the seed, which means to have it finely pulverized and light, in common language, "*like an ashheap*," does not appear to be so important as many of our farmers seem to imagine. The great object of ploughing is to destroy and cover in the earth every species of vegetation, that the crop to be expected from the seeding may have nothing to choke and impede its growth, or deprive it of any share of the nutriment that there is in the soil,

cing even weeds. The rest of the field, excepting several of these hillocks, was a thick clover-sward, which was turned over in the fall, and about the same time the marl was conveyed to these barren spots, in the proportion of from 60 to 100 loads to the acre. In the spring succeeding the whole field was planted with Indian corn. The young plants, on the places where the marl was applied, began to distinguish themselves at an early period by a much darker colour and more luxuriant growth, which they continued to exhibit through the season; and at harvest the crop was judged to be one third better than any other part of the field, from an equal quantity of ground.

The marl which was used has the appearance of *blue clay*, but effervesces very strongly with acids.

which would be useful to its own health and vigour; when this object is effected, the plough can be of no further use, except to cover the seed.

The prevalent opinion that turning in the *dew* or exposing a *new surface* of the earth frequently to the rays of the sun enriches the soil, has likewise no foundation in fact. The earth can imbibe nothing from the sun's rays but heat and light, which it possesses in sufficient quantity for all the purposes of vegetation, where it has not been moved at all. Who has not observed the most luxuriant spontaneous productions where the soil had not been stirred for years? and it is a maxim with farmers, that "where weeds grow luxuriantly, any other vegetable will." Indeed, the frequent exposure of a new surface of the soil during the summer months, must expose the volatile principles which it may contain to exhalation, and thereby endangert he loss of one essential article to its fertility, which, in soils that contain much animal matter, is very considerable. The turning in of the dew is equally absurd; it can contain no ingredient that is not found in rain-water, which is nearly pure. The dew is simply the exhalations of the day, which are condensed during the cool of the evening; like rain, it forms an essential moisture for the support of vegetation, but can have no other effect.

I saw several fields in the town of Providence, in the fall of 1821, where rye had been gathered which had been sown the fall before on sward or old pasture: the grass among the stubble was, undoubtedly, more abundant than it had been for several years before it was ploughed. This could not have failed of rendering the crop much less productive than it otherwise would have been, for besides diverting a share of the nutriment in the soil from the rye, it must have crowded and prevented its spreading.

This luxuriant growth of grass was undoubtedly

owing to two circumstances in the mode of tillage: 1st, the imperfect manner in which the sod, during the first ploughing, was turned over, owing to the great number of loose stones which impeded the free and direct motions of the plough; and, 2d, to the subsequent dragging and cross ploughing, which had the effect to place a great proportion of the sod grass-side up again, with the additional advantage of having the compressed and distorted roots torn asunder, and thinned in such a manner as to render them more susceptible of nutriment.

The evil might have been prevented, not only to the immediate advantage of the crop, but to the permanent benefit of the soil, by devoting the time that was spent in "*cross-ploughing and harrowing*," to removing the impediments to the free motions of the plough, and then carefully turning the sod so effectually as perfectly to cover the face of it; a heavy roller then passed over the surface would have the effect to secure it in its place, to press the loose earth more firmly into the spaces between the furrows, and prevent more effectually the possibility of its again vegetating. In this situation it is ready for the seed, which should be covered with a light plough or harrow, special care being taken not to disturb or displace the sod, which, thus confined, soon commences decomposing, or, in the common phrase, "*rotting*," thus furnishing an important and wholesome nutriment to the corn-plants, whose roots are pushing in all directions into its substance.

The thick, stiff, and tough nature of the soil of this region, is offered as an objection to this mode of procedure. I am aware that the spontaneous grasses, particularly on a fertile soil, commonly produce a more stubborn and unmanageable sod than that produced by the grasses usually cultivated; but I believe no method will be found more effectual in decomposing it than that of covering it closely in the

earth. The objection, however, may be remedied by substituting the more useful grasses, as clover or timothy, which furnish a much better pasture, give a greater abundance, and a better quality of hay, and, when turned under, yields a much more prolific ingredient to an exhausted soil. If this practice were pursued, I can see no reason why *wheat* cannot be produced here as well as in the adjoining town of Galway, where more wheat is raised than in any other town in the county, particularly should the mode of manuring with *lime* be adopted.

It should be observed that, in Galway, as in most places where wheat is raised in the greatest perfection, lime forms one of the ingredients in the composition of the soil, while in that of Providence, and in the whole of the primitive region of this county, where wheat is considered a very precarious crop, lime is hardly discernible among its component parts.

Experiments made with lime in Galway, and along the secondary region, have added but little to its credit as a manure. This result is owing to the soil already containing a sufficient quantity for all the purposes of vegetation. It is in the primitive region where this article is deficient, and where its application can be expected to have a good effect.

Frequent Ploughing.—That frequent ploughing is useless, and frequently injurious, may be inferred from the experience of many of the most observing farmers. The practice of merely turning over the sod and sowing on the furrows (see page 64, vol. ii., Cultivator) is becoming every year more popular, and an intelligent farmer has just given me the following account of a process which he tried the season past.

Having a clean clover field, which he intended to plant with Indian corn, a part of it was ploughed

and planted in the usual way, while the other part was merely ridged or "*back-furrowed*," at sufficient distances for the rows, while the space between was left unmoved, and green with clover, to be turned over to the hills during the process of hoeing; the corn was planted on the centre of the ridge. The success of this process was very observable through the season; the corn had a much more rapid and luxuriant growth, and at harvest yielded a considerably more abundant crop than the other parts of the field.

The result is imputed by my informant to the following causes: 1st, "the ground beneath the hills of corn remaining unmoved and covered by the furrows, retained the moisture longer than that which had been turned over and exposed to the air and sun; hence the plants did not suffer by the drought as did those on the other part of the field." And, 2dly, "the turning of the sod, which was permitted to grow between the rows up to the hills at hoeing time, furnished the roots, as they extended from the ridge, with a new supply of vegetable matter and moisture.

Natural Meadow.—Perhaps no kind of land has been more eagerly sought for, or more highly prized as an appendage to the farm, by most of our farmers, than what is usually termed "*natural meadow;*" and yet, probably, no part of the farm is so *unprofitable.* The object is to secure a crop of hay, which it seldom fails to produce; but it should be remembered, that the quantity is always much less than what might be produced from the same quantity of land by cultivation; its quality is vastly inferior, and the land is totally lost to the production of any other crop. I have frequently counted ten and twelve different species of grass within the compass of a few rods square, and not more than one or two of them that has ever been noticed as furnishing food suitable for the sustenance of stock,

to say nothing of the great variety of ferns, rushes, and mosses growing upon the same spot, which every farmer would be pleased to have annihilated.

Every farmer should calculate upon the cultivation of his grass as he does upon that of his grain; he will then be sure always to have a supply, and that, too, of a quality agreeable to his choice, while the system, if properly pursued, will have the effect to increase the quantity and quality of all his other crops to a degree that those who are not acquainted with the facts can hardly believe.

The question has often been asked, What shall we do with the field? it is too wet to plough. The answer is, *drain it.* I have seldom seen a field of this description but what might be drained for a sum considerably less than what the first crop would amount to, and the effects of draining, if properly executed, is permanent.

Since the introduction of gypsum as a manure, the plain lands have greatly increased in value and importance in the estimation of farmers generally; indeed, these lands have been commanding a higher price in this county than those of any other description under the same state of cultivation, and it is now believed, by those who have the best opportunity to judge, that no soil can be brought so easily and cheaply into a state of profitable cultivation as that of the plains. This opinion has caused them to be sought after more, and, of course, has raised their value. The soil of these plains, being naturally light, is soon exhausted by improper tillage; but where the plan laid down in pages 63 and 65 of the second volume of the Cultivator has been adopted and pursued, there has been no depreciation in its productions, but, on the contrary, they have been almost incredibly augmented.

The subject which excites the most serious apprehensions with regard to the profitable tenure of this class of soil, is the deficiency of fencing tim-

ber; but this defect will probably be supplied by the introduction of "*hedges*," and it is believed that our own forests contain the necessary materials for effecting this object, in the CRATÆGUS CRUS-GALLI, or COCCINEA (*common thorn-bush*). There are several species of this shrub, natives of the soil, some of which will unquestionably answer our purpose better than any that can be introduced from abroad.

The first and only attempt which I know of in this county to bring this system into operation, was undertaken by Mr. Davis, on land belonging to J. K. Beekman, Esq. During the fall past, 500 of the plants of this shrub have been placed by Mr. Davis in regular order to form a hedge; they are planted in two parallel lines, twelve inches apart, and at regular intervals of six inches. Mr. D. has likewise planted a quantity of the seed, with a view of ascertaining the best method of obtaining the plants. This is an experiment of much interest, and the result will be looked for with anxiety.

Pruning fruit-trees.—We deprecate the old practice of trimming fruit trees in autumn, winter, or spring. Vegetation being then dormant, the tree can make no speedy effort to cover the wounds inflicted by the knife and saw. These wounds, exposed to searching winds and a scorching sun, become diseases, and often bring on premature decay. Besides, an attentive observer must have noticed, that whenever pruning is performed in the spring, three shoots are often thrown out where one has been cut away, so that the very evil which it is intended to remedy—a redundancy of useless spray—is increased rather than diminished. If pruning is performed in summer after the first growth, say in the first fifteen days in July, or the last seven in June, the tree then abounds in elaborated sap, the wounds are speedily healed, and amply protected by the foliage from the malign influence of the sun and winds. We have remarked in successive years,

and the fact is noticed by others, that when a tree is pruned in summer, there are very seldom any sprouts seen to shoot from the parts where the knife and saw have been employed. If the reader will try the experiment of summer-pruning upon a few trees, we have little doubt he will agree with us, that it has a decided preference over that performed in any other season. The grand error of our farmers consists in not pruning at all, or only at long intervals, when it becomes necessary to take out large limbs, and in doing this, the axe is too often employed, which mangles the trees so badly that they seldom fully recover from it. Pruning should be performed annually, while the limbs to be taken off and the spray are small. The operation is then trifling and safe, and the wounds speedily heal. We want no better evidence of a slovenly farmer, than to see his fruit-trees so enveloped with suckers as to render it doubtful which is the parent, a case which, bating a little fiction, is often witnessed by the traveller.

On Seeding.—Of all the practices constituting good husbandry, none are more replete with beneficial effect, and which better repay the outlay, than that of seeding. It has become an established practice with good farmers to seed frequently with clover and timothy, a practice that should be adopted by all. It is high time that the practices and opinions of our ancestors—those which derogate from our best interests, I mean—should give place to more modern and more rational views. That there has been great advancement in the science of agriculture will be conceded to by all; then why do we cling so strenuously to ancient practices when those of more modern date are infinitely superior?

I rejoice in the improvement that has been already made. Agriculture has become the theme of the day. The most enlightened of our citizens are embarking in its pursuits, which give assurances of

its being ultimately established upon a basis concomitant with its merits. Then it behooves us to follow those practices most clearly demonstrated to be beneficial; and believing seeding to be one of these, I proceed briefly to detail its utility.

The practice of seeding is too much neglected by many of our farmers, a practice which, could they be induced to adopt, I am confident in believing would not be relinquished. The natural grasses yield less of quantity and nutriment than either clover or timothy, and some others of more recent introduction. Double the quantity of pasture may be obtained from a given piece of ground well seeded, than it would otherwise afford; and for mowing there will be a still greater difference.

Independent of this, its fertilizing properties to the soil must be considered. A good sod preserves the soil from the too great influence of the sun, renders it porous, and, consequently, pervious to atmospheric nourishment; hence we observe that meadows newly laid down almost invaribly bear the greatest burden.

Whereas grounds not seeded, by being too much exposed, soon become of so compact a nature as to render them in a degree impervious to either heat or moisture, without which they cannot be capable of the least productiveness.

Autumn we consider the most proper time for sowing timothy, and the spring for clover. We have generally made it a practice to sow our timothy immediately after the last harrowing in of the wheat, having a person to follow each harrow, which leaves not a particle of ground without seed, and never have perceived the wheat to be injured in consequence.

The time for sowing clover must depend altogether on the season, whether early or backward. We have oftener sown too early than too late, and I am inclined to believe that others have fallen into the same error.

In my opinion, it should not be sown until the ground begins to dry and become settled, when it will be observed there are innumerable small crevices produced by the contraction of the earth, which will receive the seeds, and which the first rains will close, thereby producing immediate vegetation.—G. WILLETS.

Proper time for cutting timber.—During the last twenty years I have been engaged more or less in the preservation of timber, and from my experience am able to say with confidence, the old opinion of the English writers to the contrary notwithstanding, that the best time to cut timber to ensure its durability, is when the tree is in its GREATEST VIGOUR; and in this latitude, say middle of June; then the sap is in its most fluid state, and entirely escapes through the several pores of the tree. The idea that the sap of a tree recedes to its roots during winter, is, in my opinion, a mistaken notion. The sap is distributed through the tree in winter the same as in summer, and circulation never ceases, except with the life of the tree. The sap in winter is less in quantity and thicker, and, owing to its stagnant state, remains in the timber when it is cut in the winter, and becomes the principle of its destruction. Let timber for rails, posts, or other purposes be cut when it is in its greatest vigour (never mind the phase of the moon), and keep it off the ground until seasoned. In support of my position, I will repeat two instances which have lately come to my knowledge. A farmer of North Carolina wishing to fence a certain lot, went to work according to the old theory, and cut his timber during the full of the moon in February; but when he came to make his fence in May he was deficient about 40 pannels; he went into the woods and cut the necessary quantity, and put it up as the only alternative; and after some ten or twelve years, his attention being called to the fence, he found the

rails cut and split in May infinitely more sound than those cut in February. Another gentleman in New-England had an accident befall a gatepost in midsummer, and not having any seasoned timber on hand, sent to the woods for a green one, and, expecting that it would only last one or two years, had one cut during the next winter, and laid by to supply the place of the green one at his leisure. But during the ensuing summer the other post failed, and the one cut secundem artem was taken to supply the place of the last failure, and the green post thought no more of until at the end of seven or eight years, when the post last put in was found to fail, while the summer-cut post was in a perfect state of preservation.—*Genesee Farmer.*

Wornout Lands.—A friend in Virginia writes us as follows: "Enclosed I send to you thirty dollars for the second volume of the Cultivator. You will judge, by this, our opinion of the work. Our people have been deeply engaged in the production of tobacco, and our lands have been neglected, injured, and, I might almost say, destroyed. Give us some instruction, if you please, as to the best plan of stopping gullies and healing the galls with which our fields so much abound; and also directions for a farmyard, and for a barn on a pretty large scale."

A substantial compliment like this lays us under an obligation which, we are afraid, it is out of our power handsomely to requite. We confess we have no practical knowledge as to the best method of stopping gullies and healing galls, for it has been our aim to prevent both on the limited grounds we cultivate; but we have seen much of these evil effects of bad husbandry, and will venture to prescribe for their cure.

Virginia farmers, as well as many farther north, have, it would seem, resembled too much in their practice the prodigal son, who, not content to spend the *income* of the patrimonial estate, encroaches an-

nually on the principal, until *that* is exhausted, and he is reduced to want. The soil, or, rather, the animal and vegetable matter which is blended with the earth, is the farmer's capital. The more this becomes exhausted or wasted by injudicious cropping, the more this capital is reduced; and, consequently, the interest or product, upon which he depends for a maintenance, undergoes a corresponding diminution, until, at last, both principal and interest—capital and soil—are wholly exhausted. But there is a common remedy for both these evils, which, though slow, is nevertheless sure: it is persevering industry, guided by prudence and animated by hope. And it is here that the maxim of Poor Richard, that

> "He that by the plough would thrive,
> Himself must either hold or drive,"

emphatically applies. We are fearful that too many of the Virginia farmers have trusted too much to overseers and stewards, instead of studying their business and qualifying themselves personally to direct the operations of the farm. If they will devote their leisure to learn more of the principles of their business, and to directing and superintending the operations of the farm personally, they will soon discover the defects in their practice, and be able to apply suitable remedies; and we can venture to assure them that they will find this study and this practice among the most pleasant and ennobling that engage the attention of man. The Old Dominion *can* become as distinguished in her agriculture as she has long been for her hospitality and patriotism. But to do this, the mind must be brought to the aid of labour.

Gullies and galls are occasioned, we presume, by the exhaustion of the vegetable matter of the soil, by severe cropping; the omission to alternate grass-seed while the soil is capable of sustaining a

healthy, firm sod; and the want of artificial drains to conduct the water into natural channels, or to prevent it accumulating in accidental ones. A system of management the reverse of the bad one which has caused these evils, is the best calculated to cure them. That is, less must be taken off, or more carried on; grass-seed must be sown with small grain; grass must intervene more frequently in the alternation; all the means of fertility which the farm affords must be well husbanded and judiciously applied, and extraneous manures brought on, and the water conducted off the fields in gently-inclined artificial drains.

Plants are as much dependant on food for nourishment and growth as animals are; and there is as much propriety in expecting a horse to thrive at a stall which is never replenished with forage or provender, as there is in expecting a continuation of good crops from a field which is never replenished with manure. Philosophers may *speculate* upon what constitutes the food of plants, but the practical farmer *knows* that a crop is luxuriant and abundant pretty much in the ratio of the manure which is applied to the soil. The inference is irresistible, that vegetable and animal matters constitute the basis of the food of vegetables. The elements of the dead and the living plant are the same, and they are transmuted, by a natural process, from the former into the latter. Tobacco is among the most exhausting crops, as it takes much from the soil, and gives little or nothing to it in return. We are told that it is a rule in Holland and Flanders, not to sow flax on the same field oftener than once in eight or ten years, on account of the exhausting quality of the crop, which, like tobacco, returns nothing to the soil.

The means of fertility on a farm are seldom either well husbanded or well applied. Every vegetable and animal matter may be converted into the food of plants; and the urine of the stock, when

yarded, and which, in Flanders, constitutes almost a moiety of the manure, might be mostly saved, by keeping the yard well littered, or bedded with swamp earth, to absorb it. Gypsum is a powerful auxiliary on light soils, where clover forms the basis of improvement; lime benefits stiff soils, and marl, where it is found convenient, is employed as a means of inducing fertility with manifest advantage.

We have seen the following method practised with success, to render gullies productive, and to cover with a healthy sod the galls, which are generally on the declivities of gullies. The first object was to prevent an accumulation of surface waters passing down, by drains constructed to carry it off where it would do less injury. The next step was to fill the gullies with brush and earth, smooth the declivities, so as to give to the earth a comely appearance, and then to carry on and spread a layer of coarse manure from the cattle-yards, abounding in straw, hay, and seeds. When necessary, enough earth was spread over this to prevent the litter being blown away. In the course of the season, the grass-seed sprung up, the manure afforded sustenance to the plants, and, cattle being kept from the place, a substantial sod was soon formed, which is yet suffered to remain undisturbed by the plough.

Upon the subject of cattle-yards, we beg leave to refer to our directions for their construction, published in the first volume of the Cultivator, page 62.

We confess ourselves not sufficiently acquainted with the husbandry of Virginia to venture an opinion as to the model of a barn best suited to one of its large farms; but we would respectfully solicit an answer to this part of our correspondent's request from a more competent pen.

CHAPTER XIV.

Miscellaneous Articles—Continued.

Diseases and Enemies of Fruit-trees.—The fact that many valuable fruit-trees, and sometimes even whole orchards, are destroyed by diseases and insects, shows the importance of attention to the subject. A concise account, therefore, of the various diseases and enemies to which fruit-trees are liable, and the most efficient remedies which have yet been made known, may prove acceptable to young or inexperienced cultivators of fruit, especially as this information is now scattered through a great number of horticultural works, which perhaps are accessible to a few only. We therefore propose to give brief descriptions of the most formidable and common of these evils, and their respective remedies.

Apple.—The hardiness and vigour of this tree is such, and its enemies comparatively so few, in the western part of New-York, that little difficulty has been yet experienced in its successful cultivation. It has occasionally, however, its evils to contend with. Among the most common are, 1. Canker. 2. The Borer. 3. The Caterpillar. 4. The American Blight.

1. *Canker* is a disease ascribed to various causes. Some attribute it to the poorness or wetness of the soil; others to the trees being exposed in a bleak situation to frosts and cold winds; but the most probable cause is external injuries sustained by applying ladders in gathering the fruit, leaving dead branches remaining on the tree, and by injudicious pruning. Where trees thus receive large wounds,

decay frequently commences in those parts, and gradually extends until the tree dies. Wherever, therefore, wounds have been made, whether by pruning or otherwise, they should be protected from the air and moisture by a thick coat of paint or a mixture of tar and brickdust.* Where canker has actually commenced, either in apple or other fruit-trees, the only remedy is to cut away (with a drawing-knife or other suitable instrument) all the affected parts, protecting the freshly cut surface with a coating of paint, wax, or other similar substance. Canker is sometimes caused by pruning in the spring while the sap is in rapid circulation, as it then oozes out upon the wound, causing it to turn black, and producing decay in the branch.

2. *The Borer* is an insect which perforates the wood at or a little below the surface of the earth. They may be taken out by means of a slender barbed wire, which can be introduced into the hole for this purpose. Where the hole is too crooked for this, soapsuds, or a strong decoction of tobacco, injected into it, will destroy them. Whatever mode is adopted to destroy them, the operation should be repeated several times during the summer, in order completely to extirpate them.

3. *The Caterpillar* has heretofore been the most formidable enemy to the apple-tree in Western New-York. It first makes its appearance in the spring, just as the leaf-buds begin to open, when it is not the tenth of an inch long, and no larger than a cambric needle. It is then very easily destroyed by means of a brush dipped in some caustic or poisonous solution, as of lime, soap, or tobacco. It is

* There is nothing equal to a cataplasm of fresh cowdung. Plaster it upon the wound while fresh, and cover it with a coarse cloth or swingling tow, and tie loosely. It not only protects from the air and moisture, but possesses remarkable healing qualities, whether applied to the wounds of animals or vegetables.—*Cultivator.*

destroyed with less ease as it increases in size When fully grown, it is two inches long and a quarter of an inch in diameter. It then spins a cocoon and passes to the pupa state, and in the latter part of the summer comes out a brown miller. It then deposites its eggs near the ends of the smaller branches, in the form of a band or broad ring round them, each ring of eggs containing about five hundred. These may be cut off and destroyed at any time during the autumn or winter. Every ring of eggs thus destroyed will prevent a nest of caterpillars the next season.

4. *The American Blight* (so called) is caused by the *Aphis lanata*, a small insect so thickly covered with fine white hair as to appear enveloped in fine cotton; hence it is sometimes, and more appropriately, termed *white blight*. In England, apple-trees have been greatly injured, and sometimes destroyed, by it. The insect is described as furnished with a fine bristle-like beak, with which it pierces the bark and abstracts the nourishment from the cambium or newly-formed sapwood. The sapwood being thus wounded, rises up in excrescences over the whole surface; the limb grows sickly, the leaves turn yellow, and the branch perishes. Branch after branch is assailed in turn, until they all become leafless and the tree dies. The insect spreads from tree to tree, by being carried on the wind by means of its long cottony tufts of hair. It is easily destroyed on young trees, and those older which have been recently attacked, by coating over, with a painter's brush, the affected parts, with a mixture consisting of equal parts, by weight, of rosin and fish oil, melted together and applied warm. This prevents the escape of the insects and stifles them. The operation should be performed early in the season, or as soon as the hoariness occasioned by the insects appears on the branches. As this insect has as yet been introduced into this country in but

small numbers, it becomes important to watch it closely, and destroy it now at the outset before it becomes extensively spread. The application of softsoap has been recommended for its destruction when it first appears on trees from infected nurseries.

The canker-worm is perhaps the most destructive insect to the apple-trees which has infested American orchards, but it appears to have been hitherto confined to certain parts of the country only, particularly of New-England. It ascends the trunks of the tree in the spring, and in a short time destroys all the leaves of the tree, and thus eventually causes its death. The most common method is tarring daily the body of the tree during the season of its activity, and thus preventing its passing up the tree.

Quince.—The most formidable, and, perhaps, nearly the only, enemy to the quince is *the Borer*, which attacks the tree in the same manner as that of the apple. The same remedy is to be applied. It is said that the borer may be excluded by enclosing the lower part of the trunk in tan or unleached ashes during the spring months. Grafting the quince above ground on pear stocks will also in a great measure save it from the attacks of the borer, as the pear is rarely touched by it.

Pear.—The pear, in common with the apple and other trees, is liable to occasional attacks from the caterpillar, and sometimes from a few other insects, but its great and peculiar malady is the *Fire-blight.* This first affects trees generally during the early part of summer, sometimes later, causing the branches and leaves suddenly to turn black and die. It is attributed to a very small insect (*Scolytus piri*), which eats a small circular ring under the bark round the branch, thus cutting off the upward flow of the sap. Where the insect has been discovered, it has been some inches below the affected part.

The only remedy is to cut off the diseased branch immediately, at some distance below, and commit it to the fire. This course, when faithfully and unremittingly pursued, has been found entirely effectual in preventing the ravages of this formidable enemy of the pear. Some attribute fire-blight to other causes than the work of an insect, but all agree that the only effectual cure is to cut off and burn the limb.

Plum. — The principal enemy to the plum, as well as to all smooth stone fruit, is the *Circulio.* This is a small beetle or bug, about a quarter of an inch long (its head and thorax resembling at first glance a long bean, serving at once to distinguish it), which punctures and deposites its egg in the young fruit. A worm proceeds from this, which feeds upon the fruit, and causes it prematurely to fall to the ground; when the worm passes immediately into the earth, and continues (as it is supposed) in the pupa state during winter, and the next season comes out in the perfect state to propagate its species by again puncturing the fruit. Now if, when the fruit falls, it be destroyed immediately, before the worm escapes, the fruit of the succeeding year will be saved. This may be easily effected by suffering a number of swine to feed among the trees to devour all that fall. But where swine cannot be admitted, the best way is to jar down the insects during the time of laying their eggs, by a stroke of the hand or of a mallet, when they may be caught in white sheets of cloth spread under the tree to receive them, and destroyed. Where this operation has been performed two or three times a day, it has soon cleared the tree of them.

The plum-tree is liable to a disease sometimes called canker, which is an excrescence upon the branches, at first green, and afterward becoming black; the diseased branch soon dies, and the whole tree gradually perishes. It is prevented by cutting

off all the affected branches as soon as the disease appears, and burning them. By seasonable care, it may thus be prevented from doing farther mischief with little trouble.

A large number of plum-trees in this state suffered greatly from some unknown cause in the early part of the autumn of 1833. The leaves fell prematurely, in consequence of which the fruit was not perfected, and the trees themselves received a check from which many of them did not recover. A large number have since died; many, however, perhaps the greater part, are now recovering, and some have assumed their former thriftiness.

Peach.—The peach is particularly subject to the attacks of an insect called the *Peach-worm*, and to a disease known by the name of the *Yellows*.

1. The *Peach-worm* is produced from the eggs of a lepidopterous fly (*Ægeria Persicæ*) which deposites its eggs during summer in the bark of the tree near the roots. The worms which these produce penetrate the bark to the external surface of the wood, and commence the work of destruction, sometimes devouring the inner bark entirely round the tree, and speedily causing its death. It is rare, however, except in very small trees, that death is produced, as the worm seldom eats completely round; in which case the injury only retards its growth. Its presence is readily detected by the gum filled with excrementitious matter, which oozes from the tree near the surface of the ground. The best remedy is to remove the earth from round the foot of the tree, together with a small portion of the injured bark, when the worm will be exposed and may be readily destroyed. All the holes should be traced to their end, in order to see that the tree is cleared of them, cutting the bark as little as possible, so as not to injure the tree unnecessarily.

2. *The Yellows.*—This disease is by far the most formidable evil which the peach has to encounter.

It is entirely peculiar to the peach and nectarine. Its cause is unknown. It is first indicated by the fruit ripening three or four weeks earlier than usual, genrally with red specks and blotches upon it. This commonly takes place on a part of the tree only. The following season, a number of very small wiry shoots grow from the larger branches, the leaves become yellow, the whole tree assumes a weakly appearance, and eventually perishes. What renders this disease the more to be dreaded, is its contagious nature. If not checked, it commonly spreads through the orchard. The infection is supposed to be communicated at the time of flowering by the pollen or farina which is carried from tree to tree; the fruit thus receives the malady, which is quickly carried by the circulation of the sap through the branches and trunk. The disease is also always communicated where a bud from an infected tree is inserted on a healthy one; and even by pruning a healthy tree with a knife which has been previously used on a diseased one. After it has once attacked a tree, there is no remedy; it must inevitably perish. Wherever, therefore, a tree is seen ripening its fruit prematurely, especially if that fruit be marked with red blotches unusual in it, it is to be looked upon as a lost tree; nothing can save it; and nothing can save adjacent ones from becoming infected but by destroying it before it blooms again. No peach-tree should be planted on the same spot until several years of intermediate cultivation; perhaps it will be best, in most cases, to plant fruit-trees of some other species, which are not attacked by this disease, in places where such peach-trees have stood.

Nectarine.—This fruit-tree is subject to the same diseases as the peach, of which, indeed, it is considered as but a variety; and the same remedies apply to both. Its fruit is also subject to the attacks of the curculio, for an account of which see the article on the *plum*.

Apricot.—The principal enemies of this fruit are, 1. *The worm*, or *Ægeria*, which has been described in the account of the peach; and, 2. *The curculio*, described in the account of the plum.

Cherry.—In Western New-York the cherry has but few diseases or enemies, and those of little importance. Some varieties are attacked by an insect which causes large excrescences on the branches. Whenever these appear they should be immediately cut off and committed to the fire. Perhaps the greatest enemy is the *Cedar-bird*.* The only known way of repelling them is to thin their ranks by means of powder and shot, when they become suspicious and fearful, and less voracious in their depredations. Small trees of choice varieties may be protected from the birds by covering them with a large coarse net, made of bass-matting or other material.—*Genesee Farmer.*

Preserving Meats.—The intrinsic value of salted meats, whether for family use or for market, depends materially upon the manner in which they are preserved. An excess of salt renders lean meats, as beef and hams, hard, tough, and unpalatable, besides destroying much of their nutritious properties; while too little salt, or an equivalent of some other antiseptic, will not preserve them in a healthful state. It is as easy and as cheap to preserve meats well, as it is to do it badly, if we are furnished with good rules, and duly observe them. There are, no doubt, many rules adapted to this end. We have tried many, and have finally, for some years, adopted, with perfect satisfaction, for family use, the pickle which we give below, for the curing of beef and hams. It is said to be equally good for pork, though we have not used it for this purpose, as we lay down none but the fat part of the hog,

* This is a small bird, about the size of the blue bird, of a light brown colour, readily distinguished by its crest; and is, by its voracity, very destructive to ripe cherries.

which is not injured by an excess of salt. This has been denominated the

Knickerbacker Pickle.—Take six gallons of water, nine pounds of salt, three pounds coarse brown sugar, one quart of molasses, three ounces saltpetre, and one ounce pearlash; mix and boil the whole well, taking care to skim off all the impurities which rise to the surface. This constitutes the pickle. When the meat is cut, it should be slightly rubbed with fine salt, and suffered to lay a day or two, that the salt may extract the blood; it may then be packed tight in the cask, and the pickle, having become cold, may be turned upon and should cover the meat. A follower, to fit the inside of the cask, should then be laid on, and a weight put on it, in order to keep the meat at all times covered with pickle. The sugar may be omitted without material detriment. In the spring the pickle must be turned off, boiled with some additional salt and molasses, skimmed, and, when cold, returned to the cask.

For domestic use, beef and pork hams should not be salted the day the animals are killed, but kept until its fibre has become short and tender, as these changes do not take place after it has been acted upon by the salt.

Meat that is to be dried and smoked requires less salt than that which is to remain in pickle, on account of the preserving qualities of pyrolignic acid, which is supplied by the smoke of the wood. The great art in smoking meat well seems to consist in having the meat dried by smoke, and not by heat. The hams of Westphalia and the smoked beef of Hamburgh, which are unrivalled in reputation, are managed in this way. The Westphalian farmers have a closet in the garret, joining the chimney, made tight, to retain smoke, in which they hang their hams and bacon to dry, out of the effect of the

heat of the fire. Two apertures are made from the closet into the chimney, and a place is made for an iron stopper to be thrust into the funnel of the chimney, to force the smoke through the lower hole into the closet. The upper hole must not be too big, because the closet must be always full of smoke, and that from wood fires.

The Hamburgh method of making their superior smoked beef is this: Fires of oak chips are built in the cellars, from whence the smoke is conveyed by two chimneys into the fourth story, and thrown into a chamber by two openings placed opposite to each other. The size of the chamber is proportioned to the quantity of meat to be smoked, but the ceiling is not raised more than five feet and a half from the floor. Above this chamber there is another made with boards, into which the smoke passes through a hole in the ceiling of the first, whence it escapes by openings formed in the sides. The pieces of meat are hung up at the distance of a foot and a half from each other, and a fire is kept up night and day for a month or six weeks, according to the size of the pieces.

Preserving Roots.—We find in Chaptal's "*Chymistry applied to Agriculture*," an excellent chapter on the preservation of animal and vegetable substances. We extract the following from the preliminary remarks:

"The nature of all bodies which have ceased to live or vegetate, are changed as soon as the physical or chymical laws by which they were governed cease to act; the elements of which they were composed then form new combinations, and, consequently, new substances.

"While an animal lives or a plant vegetates, the laws of chymical affinity are continually modified in its organs by the laws of vitality; but when the animal or plant ceases to live, it becomes entirely

subject to the laws of chymical affinity, by which alone its decomposition is effected.

"The principles of the atmospheric air which is imbibed by the organs of living bodies, whether animal or vegetable, are decomposed and assimilated by them, while dead bodies are decomposed by its action. Heat is the most powerful stimulant of the vital functions; yet it becomes, after death, one of the most active agents in the work of destruction. Our efforts, then, for the preservation of bodies, ought to be directed to counteracting or governing those chymical or physical agents from the action of which they suffer; and we shall see that all the methods which have been successful are those which have been formed upon this principle.

"The chymical agents which exert the most powerful influence over the products of the earth are air, water, and heat; the action of these, however, is not equally powerful over all classes of plants; the soft and watery, and those which approach the nearest to animal matter, decompose most readily; the principles of such are less coherent, less strongly united than that of others; so that the action of disorganizing agents upon them is prompt and effectual.

"All the methods now employed for the preservation of bodies, consist in so far changing their nature as to deprive them of the elements of destruction contained within their own organs; or in secluding the substances to be preserved from contact with the destructive agents mentioned in the preceding paragraph; or in causing them to imbibe certain other substances, the anti-putrescent qualities of which counteract all action, whether of internal or external agents.

"In all vegetable products, water exists in two different states, one part of it being found free, and the other in a state of true combination; the first portion, not being confined except by the cover-

ing of the vegetable, evaporates at the temperature of the atmosphere; the second is set free only at a temperature sufficiently high to decompose the substances containing it: the first, though foreign to the composition of the vegetable, enters into every part of it, dissolving some of its principles, serving as a vehicle for air and heat, and being converted by cold into ice; by these several properties, it greatly facilitates decomposition: the second portion, from which no evil of the kind arises, is found combined and solidified in the plants, and its action is thus neutralized."

Drying fruits, then, in order to preserve them, consists in depriving them of the water contained in them in a free state. This may be done by subjecting them to heat not exceeding 95 to 113°, either by exposing them to the sun, or in the stove-room, or in ovens, which latter practice is resorted to, even in the warmest countries, at the commencement of the drying process. *In preserving the apple*, for instance, our author adds, that by depriving their surface of all moisture before putting them up; keeping them in dry places, where the temperature will be constantly between 50 and 54°, and by separating the fruits that they shall not come in contact, they may sometimes be preserved 18 months. The farmer in Schoharie, who has been in the habit of bringing the Spitzenbergh to our market on the 4th of July, owes his success to the observance of these rules.

On the preservation of the fruits of the earth by secluding them from the action of air, water, and heat, M. Chaptal enumerates the following leading causes of decay.

"The atmospheric air, coming in contact with fruits, deprives them of their carbon, and forms carbonic acid.

"Fruits exposed to the solvent action of water suffer decomposition, by having the affinity existing

between their constituent principles weakened, and at length destroyed.

"Heat dilates the particles of bodies, and thus diminishes the force of cohesion and attraction, and favours the admission of air and water.

"The combined action of these three agents produces very speedy decomposition; the effect produced by any one of them is slower, and the results different. So that, in order to preserve fruits from decomposition, it is necessary to guard them from the power of these three destroyers."

Practically applied, these axioms teach, that to preserve roots in good condition, the following precautions should be observed:

1. That their surfaces be entirely freed from moisture before they are housed or buried, and that they be deposited in a dry situation, where water will not have access to them.

2. That they be excluded from the air by burying them in dry earth, or slightly covering them in the cellar with dry earth. And,

3. That they be kept in a cool temperature, the best ranging from 34 to 45 degrees.

We frequently hear housekeepers complain that their potatoes, turnips, and other vegetables soon deteriorate and lose their fine flavour after they have been a short time in their cellars. This is a natural consequence of the injudicious way in which they are too frequently kept; exposed to the atmosphere and to a high temperature, in a cellar adjoining the kitchen, or, perhaps, in the kitchen itself. Again, potatoes or turnips buried in a wet condition, or the latter with parts of their tops left on, are very liable to ferment and spoil. We find it to be a necessary precaution, in burying turnips, to make one or more holes in the crown of the pit, to let off the rarefied air and abate the heat which is almost invariably generated on their being buried.

In preventing the total loss of potatoes that have

been affected by frost, Thomas Dallas directs that, when they are slightly touched by the frost, it is only necessary to sprinkle the roots with lime to absorb the water under the skin; that, when the outer portion of their substance is frozen, the tubers may be pared, and thrown for some hours into water slightly salted; and that, when they are wholly frozen, they will yield, upon distillation, a spirituous liquor resembling the best rum, and in greater quantity than roots which have not been frozen.

The quotations we have made above are invaluable to the farmer and housekeeper; and if the principles which they establish are understood and practised upon, we shall have no cause to regret the length to which we have extended this article.

Original China Hogs.—The Chinese hog is distinguished from the common, by having the upper part of its body almost bare, its belly hanging nearly to the ground; its legs are very short, and its tail still more disproportionately short. The flesh of this variety is whiter and more delicate. The colour is commonly a dark gray. It abounds in China, and is diffused through New-Guinea and many islands in the South Sea. The New Hebrides, the Marquesas, the Friendly and the Society Islands, possess this animal, and cultivate it with great care, as it is almost the only domestic animal of which they can boast. The varieties of hog cultivated in Britain are partly the result of climate and keep in the European variety, and partly the effects of crossing with the Chinese. At the same time, it is only in particular districts that so much attention has been paid to this animal as to give rise to any accurate distinction of breeds; and nowhere has it received any considerable portion of that care in breeding, which has been so advantageously em-

ployed on the other animals of which we have treated. Yet among none of the varieties of these is there so great a difference as among the breeds of this species, in regard to the meat they return for the consumption of a given quantity of food. Some races can with difficulty be made fat, even at an advanced age, though fed from the trough with abundance of such food as would fatten any other animal; while others contrive to raise a valuable carcass out of materials on which no other creature could subsist.

The Chinese race, according to Cully, has been subdivided into seven varieties or more; and it would be easy to point out twice the number of as prominent distinctions among the sorts in the third class. But such an affectation of accuracy is as useless as it would be tedious. One general form, approaching to that of other animals kept for their carcass, ought certainly to be preferred; and the size, which is the other distinguishing characteristic, must be chosen with a view to the food provided for their maintenance, and not because it is possible to raise the individuals to a great, and, probably, unprofitable weight. The fineness of the bone, and the broad, though, also, deep, form of the chest, denote in this, as in the other species, a disposition to make fat with a moderate consumption of food; and, while it may be advisable to prefer the larger breed in those places where bacon and flitches are in most demand, the smaller breeds are most esteemed for pickling, and are, beyond all doubt, most profitable to those farmers who allow them little else than the range of the farmyard and the offals of the kitchen.

The Use of Fruit.—We are familiarly acquainted with the prejudices existing against the free use of our domestic fruits, but very much question whether they have ever operated so unfavourably as is generally believed. It would be quite as philosophical to

discard breadstuffs, the various leguminous productions of the garden, and the meats offered in the market, as to interdict the rich fruits which nature has scattered around us. If a careful register were made of all the deaths arising from excess in eating these two species of food, it is quite probable as many would be found attributable to one cause as the other. Eating and drinking have become altogether too artificial; people consult their books oftener to discover how, when, and what sort of a meal should be taken, than to ascertain the state of their finances. Life is thus reduced to an unnatural scale, and the capacity of the stomach measured as a tide-waiter would gauge the dimensions of a hogshead, instead of following the simple indications of hunger, which makes no dangerous mistakes, under ordinary circumstances, in well-regulated society. There is a vast difference between gorging beyond the ability of the stomach to relieve itself, and satisfying the cravings of appetite. Were an individual never guilty of any excesses, he would be exempt from the penalty invariably imposed on the breach of any law of the animal economy.

Instead, therefore, of standing in any fear of a generous consumption of ripe fruits, we regard them as positively conducive to health. The very maladies commonly assumed to have their origin in a free use of apples, peaches, cherries, melons, and wild berries, have been quite as prevalent, and equally destructive in seasons of scarcity. All naturalists will testify to the importance of the fruit seasons to the lower animals, particularly to birds. When there is a failure or an insufficient supply, the feathered tribes are less musical, less numerous, and commence their migrations much earlier, than when amply supplied with the delicate nutrition designed for them at certain periods of the revolving year.

In the scheme of creative wisdom, the indica-

tions are clearly manifested that man is omnivorous; and it was not until muzzled by the opinions of one, perplexed by the ridiculous hypothesis of another, touching the subject of his food, of which he is himself better qualified to judge than the most learned physician in Christendom, that he relinquished the faculty of discrimination implanted in his nature, to become the football of those who raise themselves into a short-lived notoriety by giving to unfounded theories the character only belonging to well-established facts.

There are so many erroneous notions entertained of the bad effects of fruit, that it is quite time a counteracting impression should be promulgated, having its foundation in common sense, and based on the common observations of the intelligent. We have no patience in reading the endless rules to be observed in this particular department of physical comfort. No one, we imagine, ever lived longer or freer from the paroxysm of disease by discarding the delicious fruits of the lands in which he finds a home. On the contrary, they are necessary to the preservation of health, and are therefore caused to make their appearance at the very time when the condition of the body, operated upon by deteriorating causes not always understood, requires their grateful, renovating influence.—*Boston Medical and Surgical Journal.*

CHAPTER XV.

Miscellaneous Articles—Continued.

The Horse.—The horse is vastly modified in his form and character by the physical condition of the countries in which he is naturalized. If fed in a country of plains and rich herbage, he tends to become large in his form; and such is the character of the horse of the plains of Northern Europe, as of Holstein, England, and other countries abounding in rich herbage. But in an elevated country, where the herbage is scanty, the size and form of the horse vary with the circumstances in which he is placed. There he becomes small, hardy, and capable of subsisting on the scanty herbage with which the mountains supply him. No contrast between animals of the same species can be greater than that between the horse of the mountains and the horse of the plains. The pony of Norway or the Highlands of Scotland, as contrasted with the huge horse of the Lincolnshire fens, presents such extremes of strength and size that it is difficult to believe that creatures so different can be of the same species. Yet all this great diversity is produced by a difference in the supplies of food, as influenced by the effect of situation. Nor is this peculiar to the horse; the domestic ox and sheep are subject to the same law, and in a no less remarkable degree. These animals are essential to the subsistence of the human race, and, by a beneficent provision of nature, they are formed to adapt themselves to the circumstances in which they are placed.

The horse fed on the arid plains and scanty herb-

age of warmer countries, assumes characters and a form entirely distinct from those of the large and massy animals fed on the rich pastures of temperate countries. It is from this cause that the large horse of England and the northern plains of Europe contrasts in a striking manner with the lighter shape of the horse of other regions. As we pass from the northern to the southern parts of Europe, this change of form and character appears, but yet more when we have crossed into Africa. There the horse of the desert displays the light form and agile shape which fit him for his condition. We see that he is here the creature of the circumstances in which he is placed. The heavy horse of the plains of Germany and England could no more subsist on the dry and scanty herbage of Arabia than on the heaths of Norway. The species would perish in conditions so different, did nature not provide a remedy, by adapting the animal to its condition.

The ancient horses of the north of Europe must have consisted either of the smaller horses of the mountains or of the larger horses of the plains. The horse which was chiefly employed for common uses, for war, for the tournament, and even for the chase, seems to have been of the latter kind. This appears from the accounts and representations given of him, and from the form which he yet retains when unmixed with the blood of the lighter races of the South and East. It is to this intermixture that the technical term *blood* is applied. Importations long ago took place of horses from Spain, from Barbary, and the Levant; and, at a later period, from Arabia. The African and Arabian horses accordingly have given their characters to the blood-horse of England and its innumerable varieties.

The animal in which this effect of blood is the most remarkable is the English racehorse. For the combination of speed with the necessary strength, this creature can scarcely be surpassed. He forms,

however, a race of artificial creation, admirably suited for a particular purpose, but not otherwise deserving of cultivation, except from this, that it is the stallions of his race that continue the excellence and purity of the parent stock.

The superior class of riding-horses, generally termed the hunter, is perhaps the finest race of horses known. It combines the blood of the Arabian, and other races of the South and East, with the powerful form of the horses of the north of Europe in a much happier proportion than the racehorse.

From the hunter downward to the racers where no mixture of southern blood can be traced, the gradations are innumerable. It is in this class that our roadhorses and hackneys, the horses employed in our coaches and carriages of all kinds, nay, often in the mere labour of heavy draught, are contained. It forms the most numerous class of horses in the country. But a large proportion is bad, having lost the hardiness and strength of the native race, without having arrived at the speed and other qualities of good breeding.

The remaining class of horses consists of those in which no mixture, or a very slight one, of stranger blood is found. These are the ponies of our mountains, or the larger horses of the plains. It is these last that interest the farmer as the animals of labour, and to them we commonly apply the term of *cart-horse* or *farmhorse*.

Stable and Treatment.—The farmhorse demands, neither in the training nor in the feeding, that nicety which is required in the case of the horse designed for rapid motion or irregular labour. He requires merely to be maintained in good order, never to be worked beyond his power, and never to be allowed to fall, in condition, below the work which he is to perform.

The stable for the farmhorse, as for every other,

should be spacious and well ventilated. It is a great error to suppose that horses require a close, warm stable, to preserve them in health. To keep them fully sheltered, and free from the action of any cold current, is all that is requisite. The horse is well suited to bear an equal temperature, but not sudden changes produced by artificial means. Farmhorses regularly worked have been known to be kept throughout the coldest winters in merely open sheds, not only without injury, but with greater benefit to their health than if they had been too closely confined.

Next to ventilation in importance, is clealiness of the stable. No filth should be suffered to accumulate, but every day the stable should be cleaned out, with the same attention for the farm as for the saddle horse. In the farmhorse stable, every ploughman should have a small fork, a currycomb, a brush, a manecomb, and a foot-picker.

Light should be admitted into every stable to a certain extent. But in the case of farmhorses, which are only in the stable during the hours of rest and feeding, less light is necessary than in the case of the saddle-horse, which passes a great part of his time within doors. The light required for the farmhorse stable is that which is sufficient to allow the workmen to perform their duties in the daytime. Sometimes there is a room adjoining the stable for holding the harness, but it is perfectly convenient and sufficient in practice to have the simple furniture of the farmhorse hung on pins in the wall behind each pair of horses.

The food of the horse in this country consists of herbage or green forage, as clovers and sainforn; of dried forage, as hay and straw; of various farinaceous substances, as oats, barley, pease, and beans; and of the succulent roots of plants, as the potato, the turnip, the carrot, the parsnip, and the beet. Of the grains given to the horse, the most generally

employed in this country, and that which is regarded as well adapted to his strength and spirit, is the oat.

The oat is, for the most part, given to the horse without any preparation, though it is sometimes bruised, which is always beneficial, by rendering it more easily masticated and digested. It is usually given in portions at a time, familiarly known under the term feeds, the measure of which, however, varies in different districts. A feed in some places consists of a gallon, being the eighth part of a bushel, and weighing, upon a medium, about 4 1-2 pounds.

Two gallons in the day, or 9 lbs., are considered to be good feeding when the horse is on dry food, and not on hard work; when on hard work, the quantity may be increased to 3 gallons, and when on light work and green food, it may be reduced to 1 gallon, and sometimes altogether withdrawn. But on an average, 2 gallons in a day, that is, about 90 bushels in the year, may be sufficient in every case for the working-horse of a farm. In practice, too, it is not the superior, but the lighter oats that are given to the farmhorses. These are the light corn formerly described.

Oats may be given to horses reduced to a state of meal, but this is only practised in the case of gruel given to a sick horse. To induce a horse to take gruel, it is put in a pail and placed beside him, so that, when thirsty, he may drink of it.

Meal is sometimes given with cold water to horses when travelling. This is a refreshing feed to a horse on a journey, and a safe one when the chill is just taken off the water; but it is chiefly employed in journeys when time is of importance, and it is accordingly rarely given in the case of the farmhorse, who should always have time given him to feed.

When oats are kept in a damp state, fungi grow upon them, and they acquire a musty smell and bad taste. They should never be given in this state to

a horse, but should first be kilndried, so as to expel the moisture and destroy the fungi.

Barley is more nutritious than oats, although, in the practice of this country, it is not so much approved of in feeding. But over all the Continent, barley is the most common food of the horse. If bruised and mixed with chopped straw or hay, it is an excellent provender. But the most common method of giving barley to horses in England is in what is termed a mash. The barley in this case is boiled in water, and the whole is then allowed to stand until it is sufficiently cool. The mash forms admirable feeding for a sick horse; it keeps the bowels open, and is nutritive, without being heating.

In feeding horses, even when upon hard work, a practice has been introduced of feeding the horse entirely on steamed food, with chopped hay and straw. The proportions of the different kinds of food employed in this manner are not subject to rule. But about 1-4 in weight of the whole may consist of the chaff of straw, 1-4 of the chaff of hay, 1-4 of bruised or coarsely-ground grain, and 1-4 may consist of steamed potatoes. To this should be added about 2 oz. of common salt. From 30 to 35 lbs. of this mixed provender, or on an average 32 1-2 lbs. in 24 hours, will suffice for any horse.

Two methods may be adopted in the giving of this food. Either the whole substances may be mixed together, and a certain proportion given to the horses three or four times in the day; or the dry food alone may be given during the first part of the day, and the steamed food mixed with a portion of the dried food in a mess at night.

In the first case, that is, when the whole mess is to be mixed together, the potatoes or other steamed food are first to be prepared, then weighed and mixed with the chopped straw or hay, and with the bruised oats. The quantity for 24 hours being mixed and prepared, the proportion for each horse is to

be weighed and set apart in its proper pail, and given to each horse at three or more times, as shall best suit with the work with which he is engaged, taking care that considerably the largest quantity shall be given at night.

When this method of feeding is adopted upon a farm, it should be confined entirely to the months of winter, for the horses of a farm will always be best and most economically fed during the months of summer on pasture and green forage.—*Low's Elements of Practical Agriculture.*

Notes on Transplanting.—"The functions of the root are to fix plants in the earth, and to absorb nourishment from it. This absorption takes place almost exclusively by the extremities, which consist of a lax coating of cellular tubes, lying on a concentric layer of woody fibres, in the midst of which is placed a bundle of ducts."—*Prof. Lindley.*

We wish to call the attention of *some* horticulturists to the facts stated in the above paragraph, not as something new, but as a fact not generally known, or, if known, is neither heeded nor acted upon. It has doubtless been observed by every vegetable physiologist who has called into his minute investigations the assistance of the microscope, how beautifully the *extremities* of the small fibrous roots are adapted to the introsusception of the food of the plant. Almost every common planter attaches an importance to these fibrous roots, but yet not that importance which they so eminently deserve. It is the common opinion of such planters, that the absorption of vegetable food takes place throughout the *whole surface* of that portion of the plant which is usually termed the root; and provided they retain a certain *quantum* of that necessary member, it is with many, apparently, a matter of indifference which particular part is lost, mutilated, or remains whole. Persons engaged in these operations should impress upon their minds the fact that it is only the

extremities of the roots of plants that serve the purpose of collecting and assimilating the material which is so necessary to the support of the branches, and that the larger parts of the roots only serve as channels through which this support is carried to the branches.

In transplanting, we would lay it down as a maxim, that neither root nor branch should be mutilated. It is remarkable that persons of considerable experience act in direct opposition to this rule, and do not give the subject sufficient reflection to convince themselves of its truth. No one has a doubt of success when he is transplanting a young tree, and the very reason of that success is the fact that he transplants the tree *entire*. It is a common remark, when speaking of trees of a certain size, that they are too *large* to be transplanted. We do not speak of such as are too large on account of their unwieldiness and bulk, but simply such as the experience of these planters has convinced them that they cannot transplant with safety. Why are they too large? Is the plant or tree subject to any other natural laws? Certainly not; and he does not succeed so well; the operation does not proceed with such sureties of success, solely because it is not conducted in the same manner. The whole course, for some inexplicable reasons best known to the planter himself, is conducted upon entirely different principles. In the first case, the subject is small; the plant is entire; not a root or branch is amputated. But let him transplant a *large tree*, and the routine is quite different: half, at least, of the roots are cut off, either as a matter of convenience or from principle; the extremities of the roots are often utterly disregarded, being either severed entirely, or so much bruised and lacerated as to be incapacitated from performing the services for which nature intended them. One would think that to any reasonable person such a destruction of the essential organs of the plant

would quite suffice. Not so with our transplanter. He has reduced the *root; ergo*, he must reduce the *top*. Accordingly, he takes his knife in hand, and cuts off at least one half of the branches, and, consequently, their accompanying leaves; he reduces the top to goodly proportions, and elegantly removes every branch which has the misfortune to displease his fastidious eye. "Leaves," say the vegetable physiologists, "serve to elaborate the sap; they expose it to the light and air, and cause it to undergo peculiar chymical changes before it is fitted to enter into the permanent composition of the plant; they are, therefore, essential organs." This is, indeed, a different view of the case from that presented to you by many of the transplanters. "Leaves and branches," say they, "serve to consume a portion of the sap: each leaf and branch draws away a portion of nourishment from the other; *therefore*, if I cut half of the branches away, will not the remaining branches receive double the portion of sustenance they otherwise would?" Admirable logic! Every one knows the analogy which exists between vegetable and animal life. But would any person, in his senses, think of cutting off a child's arm because it had had the misfortune to lose its foot? Would any one think of amputating one leg of a beast in order that the others might receive more nourishment?

Nature, when left to herself, produces no more organs than are necessary for the proper existence of her subjects. It is obvious, therefore, that the removal by art of any considerable portion of those requisites cannot but be attended by a consequent diminution, for the time, of the vital powers. How necessary, then, does it appear to a reflecting person, that when so important an era in the life of a vegetable as the forcible transplanting of its whole body takes place, that every essential member of that body should be preserved entire. If the roots,

leaves, and branches of a tree are *essential* to the thriving condition of that tree while standing in a robust state in its native site, are not those organs still more essential to enable it to recover the shock of being transplanted. The planter above referred to will, in fact, tell you this himself. Ask him which of the two trees transplanted—the small one, with its limits and roots entire, or the larger one, with his system of decapitation upon it—which of them was afterward the most thriving. He will tell you, without hesitation, that the first grew luxuriantly at once, and that the latter was, perhaps, several years in *recovering*. "But," says he, "this is owing to the greater age of the larger one." Not at all; recent experiments have proved conclusively that trees of almost any size may, by attending to the principles here pointed out, be transplanted with safety, and continue in a state of high luxuriance and health; and I confess that it is a strong proof of the influence of habit and custom, that persons of considerable experience, with the facts before their eyes, still go on in the old way.

I have been induced to these remarks principally from witnessing the recent transplantation of forest trees throughout the country. In this case, indeed, the system is carried to the utmost of its limits. Mutilation and decapitation are the grand principles of its professors; the beautiful *trees* which *were*, after reduction into the *bare poles* which *are*, both in their appearance and success, show such excellent examples of the good *taste* and sound *principles* of the proprietors, that no correct horticulturist can view them without feeling sentiments of horror for the former and pity for the latter.

A. J. Downing.

Pleasures and Advantages to be derived from the Study of Natural History.—Natural history, though it holds out no splendid reward to those who pursue its studies, will not fail to supply its fair propor-

tion of contributions to the general welfare. Natural philosophy has furnished its lighthouses and lifeboats for the ocean, its lightning-rods and steam-engines for the land, and its safety-lamp for those who explore the regions below. Chymistry has supplied its bleaching inventions and its medicines, not to speak of the more questionable blessings of dry bone soup, linen rag sugar, and sawdust bread.

Natural history, though it seems to content itself with simple descriptions of nature, forbearing to investigate its laws or the action of its powers upon each other, will continually unfold new productions and properties in all its departments; new uses for animals, vegetables, and minerals, and ways in which they can be applied to the benefit of man. It will teach men to employ nature against itself, and to neutralize many of its evils, showing how it furnishes the antidote as well as the bane; showing, in fact, that it never puts difficulties in the way of man, without some corresponding advantage, which it rests with them to discover. Of course, it will exact something in return; it will require men to look round them with observing eyes, and to pay at least sufficient attention to nature to know how to estimate the blessings which it bestows. But, for all this, it will abundantly reward him; it will make him happy, by affording something to fill up the vacancy of his mind and his heart. If the mind ever rests, its calm is not clear, transparent repose, but corrupt and unhealthy stagnation, and this is a danger to which men are exposed much oftener than they know. We are unconscious of our inaction of mind, because revery is taken for thought; a man never looks so profoundly intellectual as when he is thinking of nothing. A solitary walk, a seat by the evening fire, are said to be favourable to thought, when, sometimes, on such occasions, not a thought passes through the mind for hours; thought being the action, not the dreamy re-

pose of the mind. Now when this science changes the thoughtless into observers; when it teaches them to look with interest upon the insect, whose instinct is so perfect and sure in all its operations; when it makes them see beauty in the frail loveliness of the flower, which now they crush beneath their feet; when it leads them to examine the rich plumage, or listen to the song of the bird, instead of destroying it with wanton cruelty, it renders them a service which cannot be over-estimated; it opens fountains of enjoyment for them which will never cease to flow.

In this point of view, we have no doubt that these studies might be employed as an efficient instrument of moral reform. For it cannot be questioned, that most men are driven to their lawless indulgence, not by their love of it, not by the strength of the temptation, but by the horrors of a vacant mind, which induce them to seek this relief from themselves. The force and resistlessness of the temptation consists, not in its own attraction, but in the unhappiness of a mind preying upon itself, which eagerly catches at any means of relief for the moment, without thinking of the consequences. It is in such vacant and unguarded hours that the evil spirit of sensual indulgence attracts and secures its victims. Now those pursuits which furnish an excitement to the mind will arm it against such fascination by keeping it in that action, which is as essential to virtue as it was to eloquence, in the opinion of the great master of the art. Moral reforms are apt to resemble those of political parties, which remove one set of evils by substituting another; but whoever supplies subjects of engaging intellectual interest to the minds of men goes to the root of the evil, while others are hewing at the branches, which spring again as fast as they are cut away.—*North American Review for October.*

CHAPTER XVI.

Miscellaneous Articles—Continued.

Pastures.—It is now a well-settled opinion among good farmers, that lands generally cannot be profitably improved for a course of years, either for meadow or tillage crops alone; but that the product and profits in both cases are materially increased, by changing from one to the other alternately. Constant tillage exhausts more than the manure of the farm can restore; while in the meadows the burden of the hay annually diminishes, the soil becomes compact and hard, the benign influence of heat and air are partially excluded from it, the finer grasses run out, and their place is naturally usurped by moss and a stinted herbage. Besides, alternation seems to be among the primary laws of nature. We all know the importance of alternating our tillage crops; that a field will not carry the same grain or kind of roots two or more years in succession, without great expense in manuring or constant diminution in product; and that meadows, after two or three years from being laid down, manifestly decrease in their product.

The same law that renders alternation of grain and grass essential, applies with equal force to our pastures, although the opinion has prevailed, and with most persons is still popular, that old pastures are the best. To satisfy any farmer of the error of this opinion, let him appropriate an acre of old and an acre of new pasture, recently laid down, to hay. If the land is of similar quality, he will find that the new will give him two, three, and probably four times as much hay as the old. The

same difference that we find in the hay must exist in the pasture. The disparity appears not only in the quantity, but in the quality and duration. From the soil being more permeable to heat and air, the active agents of vegetable decomposition and nutrition, the grass starts earlier in the spring, when most in demand, and continues to grow longer in autumn in the new than in the old pasture. The plough and the harrow, and a change of crops, are as necessary to renovate pasture as they are to renovate meadow grounds. In noticing the modern system of Scotch farming in a recent work, we observed that on a farm of 500 acres there was not an acre of grass, in pasture or meadow, which had been laid down more than two years.

As pertinent to the subject, we make the following extracts from a communication of Mr. Main, in the March number of the Edinburgh Quarterly Journal of Agriculture.

"Struck, when a boy, with delight at the evergreen meadows of Doncaster, and the freshness, in the dead of winter, of the fields near London, I could not, in settling in the north, help contrasting these —with a feeling almost bordering on disgust—with our whity-brown *grass parks* of Scotland, wearing, in many places, a pale blue tint till the beginning of June, or puffed off in the newspapers as affording 'a full bite' in the middle of May. I said to myself, 'cannot industry and exertion produce a change in our grass-lands? Perhaps we cannot expect to vie with Doncaster or London, but still something may be done.' So, doffing the gay soldier's coat, and putting on the hodded gray, I set to work to try if fine pasture could not be got in Scotland. Long did I toil at top-dressing; all the never-failing, oft-recommended recipes of this compound and that compound, I tried in vain; peat-earth in all the varied shapes of mixture with lime and dung, soot, composts with scrapings of ditches or other matter; all

these tried in various ways. I exhausted the pharmacopeia of agricultural quacks; and soon found out that, without the aid of plough and harrow, nothing could be done; in other words, that the ground must be put in *good heart* before you can have *good grass*.

"Well, that being done, I had fine grass, but it grew bad again; it was not fine *permanent pasture*. I had recourse once more to the old system of top-dressing, and, of course, improved the pasture, but again it fell off. By this time I had before my eyes the palpable fact, that new-laid-down grass was good, and that, do what I would, old grass could not be made to bring the same rent.

"It appears to me, that it is only on certain soils and situations that pasture can be allowed to remain without great loss; that such situations are flat meadows, or the neighbourhood of rivers or streams, rich in alluvial soil, and the natural habitat of the pasture plants, or in the vicinity of large towns, where manure has been applied till the ground could not bring a grain crop to maturity; and that, on all other situations, recourse must be had to the plough as soon as a failure in the grass crop takes place; and the breaking up will entirely depend on the quality of the land and manner in which it has been treated, there being no such true *unerring* guide to the *quality* of the land as the length of time it can be profitably left in pasture." "Little need be said on the unprofitableness of old pasture to the actual farmer. There is little old grass to be found on the farm of a man who has rent to pay. Have you never remarked the difference of rent that is given by a grazier or butcher for a field of new and a field of old grass? Have you ever put the question to yourself, why is this? I shall give you the answer: Let both fields be shut up and cut for hay; weigh the produce; see the great difference in favour of the new grass, and the secret is out.

Still keep the cattle from the field: look at the new grass, how soon the aftermath springs! Well, then, is not the overplus of the hay that which would have fed so many more cattle? and yet people prate about old grass.

"Not only is the produce of an acre of new grass far greater than that of an acre of old, but it is more palatable to the cattle, and, as far as I have been able to observe, exactly in the ratio of the age of the grass. An example of this came lately under my eye: A tradesman occupied a field which he cultivated regularly, breaking up a bit, green-cropping it the following year, and then sowing it down, after which he pastured it by wethering his beasts. The man having the place, I caused some hurdles (fence) to be put around the bit not in grass, and left the rest of the field in pasture. The cattle, during the whole of summer, ate the new grass to the very earth, and did not taste the older until the force of hunger made them do so. Next season, the bit which had been hurdled off was sown out, and was allowed to go with the rest of the field. The very same thing took place; the new grass was first eaten, and then that which was older. I had an opportunity of observing last summer the marked preference which sheep give to young grass compared with old, by putting cattle into two fields, separated by a fence only—one very fine grass of some years standing, the other only three years old—and pulling out some of the lower rails of a communicating gate, permitted forty sheep to pass through and pasture in whichever field they pleased. The result was, they were constantly to be found in the field of younger grass, and very seldom went into the old grass enclosure. At last I was forced to shut them into the old grass, finding they were reducing the feed in the one and leaving too much in the other. Be it always remembered, that land must be well laid down. If grass, how-

ever new, be growing on poor land, or wet, or on land that has been badly cleared, cattle do not relish it. I have seen frequent instances of this. More particularly do they dislike pasturing on foul land."

"Having now broached the subject, I would not, for the present at least, pursue it any farther; but, ere I take my leave, I would, in the first place, state, in corroboration of what I have been endeavouring to maintain, that by following the breaking-up system instead of the top-dressing one, I have not only altered the verdure, but I have increased the rent of the old grass lawn on my farm from three to five fold. In conclusion, I would make a brief recapitulation of my sentiments: I maintain that, except a few favoured spots, as banks of rivers, &c., no ground can, without loss, be left long in pasture: that it appears to me four or five years is, generally speaking, the longest period land should be allowed to lie in grass; that if pasture be the object, at the end of that time the ground should be broken up and returned to grass again. I maintain that, *without grass*, severely cropped land cannot be restored to full fertility; and *without cropping*, grass cannot be made to continue at the maximum point of utility and verdure."

Proper Time for Cutting Grain.—We find an interesting article upon this subject in the Farmers' Register, which details the result of the writer's observation and practice for twelve or fourteen years, on an extensive farm. The length of the communication and our restricted limits necessarily limit us to a brief notice of this communication. The writer admits, that if we could be sure of good weather, it would be best to omit reaping till both grain and straw are ripe; but as this cannot be the case, and as the crop suffers and loses greatly if not cut and secured as soon as it is ripe, he is sure that a great saving will be found in reaping wheat *as ear-*

ly as the state of the grain will permit. He considers that "wheat is fit for the scythe when the grain is in the *dough state;* no matter how soft, provided it is clear of milk, or when no fluid comes out separate from the dough, when the grain is mashed between the fingers. But no one square yard of wheat can be found, in which all the heads have reached this state at one time; and, therefore, when not more than one tenth part of the grains contain milk, I think it safe to begin to reap." "My green reaping, when first commenced (in 1821) was fully *nine* days earlier than was usual; and it was pronounced then that I was destroying my crop, by reaping it so green. My practice is still condemned by many, who, however, have gradually, and perhaps unconsciously, advanced the commencement of their harvests, until they are not more than two or three days behind mine." The saving made in one season by early reaping, when a long spell of rainy weather followed, which destroyed more than one half of his neighbour's crops, was enough to pay for all the loss incurred by that plan in twenty years. The writer does not believe that anything is lost either in the weight or bulk of grain cut in the dough state; and as to the quality of the grain for making flour, he believes it generally conceded that the wheat reaped green is the best.

The truth of the foregoing remarks is corroborated by the opinions and practice of many of our best farmers. These observations apply equally to other small grains, particularly to rye. The great objection to the practice is, that the grain is not fit to be bound, as it should be to prevent waste and save it from rain soon after it is cut. This objection is obviated by making small sheaves, and putting them in "stooks" of about six sheaves each, by setting the stubble ends of the sheaves far enough apart to give sufficient base, and letting the heads of all lean together so as to form a point. These throw off a

light rain, and will dry as they stand if made wet by heavy rain. When dry they may be put into shocks.

On Haymaking.—Having observed that in a season when there was no rain whatever, and the hay had been made with rapidity, and carted within a short time after it had been cut, that a greater quantity was destroyed and injured by being overheated and burned, than in a catching, irregular season; that, when hay had not heated in the stack, it is frequently mouldy; that, as hay lost its native green colour and approached a brown, it lost its nutritive qualities; and that, altogether, the making of hay, as usually conducted, was a very precarious and teasing operation, I determined on trying to arrange a system on some more regular and certain principles, in which I succeeded; and by adopting a certain and regular course of operations, was enabled to make my hay of a uniform good quality, and let the weather be as it might, at a regular expense of labour. And considering such a process not only of importance, as it ensures a more perfect quality, but as it affords a more certain protection against the injuries usually consequent on the uncertainty of the weather and overheating in the stack, and that it thus removes two great causes of anxiety, it may be well worth the public attention.

In the first place, as to the state of the weather, it generally happens at this season of the year that there are three or four days dry; therefore, on beginning to cut the grass, as it is well known that during wet weather grass may be cut, and suffered to remain in the swarth for several days without injury; and it being desirable, where hands are plenty, to have a good quantity, or so much as will complete a stack in a day, in the same state of forwardness, I should prefer beginning to cut during the rainy weather; however, be this as it may, swarths should not be opened but on a certain fine

day; and, when this is done, the grass should be well shaken apart and equally spread over the ground. As soon as the upper surface is dry, turn it well over; and in this operation great care should be taken to open and spread any cocks that may not have been divided in the first opening. This being done, commence raking into wind-rows, in time that the whole may be made into small cocks before night. *The second day these cocks must remain untouched, let the weather be wet or dry:* the third day, if the weather be certain and fine, throw the cocks open; but if the weather be wet and threatening, they may remain another day, or until the weather is certain to be fine for the day. The cocks should then be thrown, according to the crop, into beds of two or three rows; and after three or four hours' exposure, turned over; and taking time to gather the whole into wind-rows and cocks before night, let this operation commence accordingly, *and none be left open;* the day after this, which in fine weather will be the fourth, *the cocks must again remain untouched, or not be opened, whether the weather be wet or dry.* On the fifth or next day these cocks will only require to be opened for an hour or two, when they will be fit for the stack. The novelty of this mode consists only in suffering the hay to remain in the cock the second and third, or alternate days; and at first sight it may appear that so much time in fine weather must be lost, but this is not the case. While the hay remains in cocks, a slight fermentation, or what is termed sweating, will take place, and in consequence, after it has been opened on the third and fifth days, it will prove to be just as forward as if it had been worked every day. And the advantages resulting from this are obviously the following: by shortening the time of open exposure, the colour of the hay is more perfectly preserved, and, consequently, the quality; and the fermentations or sweatings

which take place in the cocks, proved so much to have diminished that principle or inclination to prevent its heating injuriously in the stack; and the whole operation of making, whether it takes four days or eight, requires three days' labour only, and the hay being left in that state every night, in which it is the least possibly exposed to the injuries of the weather, and in which it may remain for a day or two, in uncertain weather, without injurious exposure, much painful anxiety and useless attendance of labourers are obviated.

Smut in Grain.—This disease, particularly in the wheat crop, causes a great deterioration in the quality and consequent value of the grain, and is the cause often of heavy loss to the farmer. It seems to have prevailed in the time of the Roman empire, and is mentioned by Pliny and Columella; yet down to the present day the origin of the evil is not satisfactorily known, though the surmises, and speculations, and experiments have been without number. Jethro Tull ascribed it to moisture. Duhamel, after recapitulating the different opinions and experiments on the subject of smut, concludes with observing that smut powder is highly infectious, and recommends leys of lime, saltpetre, alum, verdigris, salt, and wood ashes. Lord Somerville was of the opinion that the disease was occasioned by an insect. In the course of his researches, by using highly-magnifying lenses, and by concentrating the light of the sun on the smut-ball by means of a concave mirror, he discovered that the specks on the ball were real insects, resembling woodlice in shape. He then conceived, that when the smut powder comes in contact with sound grains, it adheres to them, and inoculates them, so as to render the plant incapable of producing anything but smut. Linnæus, Walker, and other naturalists were of the same opinion, that insects caused the smut. Sir H. Davy was of opinion that smut is produced by a small fungus on the grain, as the products it affords by

chymical analysis are similar to those afforded by the puffball, and thinks that, without the agency of some organized structure, so complete a change could not be effected in the constitution of the grain. Wildenow thought that smut proceeded from a fungus, which multiplied so as to occupy the whole ear. Prevost ascribes it to a microscopic vegetable of some sort; and Jussieu says, the proximate cause of smut may be attributed to infection of the seed, by the dust of the smut-ball (Lycoperdon). Bauer, of Kew, says the smut "is occasioned by a very minute parasitic fungus of the genus *uredo* being absorbed by the roots of the germinating wheat grains, and propelled by the rising sap, long before the wheat blossoms, into the young germen or ovum, where the seeds of the fungi vegetate, and rapidly multiply; thereby preventing not only the fecundation of the ovum, but even the development of the parts of fructification. In consequence, no embryo is produced in an affected germen, which, however, continues to grow as long as the sound grains do; and, when the sound grains arrive at maturity, the affected ones are generally larger than, and are easily distinguished from, the sound ones, by their darker green colour, and from the ova retaining the same shape and form which they had at the time the infection took place."

The preventives of the disease are numerous, and most of them within the reach of our farmers. They are generally such as are calculated to destroy any noxious quality adhering to seed grain, be it the seeds of minute parasitic plants or of animalcula. Tull has related, that the use of salt-brine as a pickle was discovered by the sowing of wheat steeped in salt water, and which escaped smut when nearly all the wheat in England was affected. A solution of nitre, copperas, and potash, in the proportion of eight pounds to 100 pints of water; arsenic; a decoction of tobacco, hellebore powder, and aloes; a mixture of water, wood ashes, alum, vitriol, and

verdigris, boiled for an hour, have been all recommended with confidence. In Norfolk, England, the salt is dissolved in a small quantity of water just sufficient for the purpose; lime is slacked with this solution, and the wheat is dried with it in its hottest state, having been previously moistened with pure water. In Yorkshire one ounce of white arsenic, finely powdered, is boiled in a gallon of water for two hours, and stale urine is added to increase the quantity to two gallons; then the wheat is steeped in the liquor and incrusted with quicklime. In parts of England and Scotland, stale urine, free of any mixture, is generally used; and, in a practice of forty years, Messrs. Culleys used this preparation, and never had any smut. Mr. Donaldson made sixteen experiments with seed impregnated with smut powder, and sowed some without any preparation, and the residue steeped in preparations of arsenic, vitriol, chamber-ley, and lime. That sown without preparation was one half, and five sixths (being two parcels) smutty, while that steeped in chamber-ley and limed had but one smutty ear in forty-six. Mr. Bauer expresses a strong conviction, from repeated experiments, that steeping the seed in properly prepared lime-water for at least twelve hours, and then to dry it well in the air before sowing it, is the surest way to prevent smut.

It is the practice of many of our farmers to steep the seed-grain in lime-water, and though it does not wholly prevent smut in all cases, it certainly has a highly salutary effect in lessening the evil. Our practice has been to steep the seed twelve hours in salt pickle, and then incrust with quicklime; and when we have adopted this course no smut has been perceptible. Wherever experiments are made with steeps, it is well to sow a quart or two of seed without any preparation, the better to test the benefits of the steep. We hope our farmers will test the efficacy of steeps with their seed-grain, and particularly those of lime and salt; and if they will make

accurate notes, and communicate to us after the next harvest the result of their experiments, not only in regard to smut, but the grain-worm, we may hope to make the Cultivator the medium of much useful information upon these important subjects.

We repeat the admonition, to use fresh-burned lime where practicable. Lime long exposed to the atmosphere loses, in a great measure, its causticity; by absorbing carbonic acid it is restored to the state of limestone or chalk, and its alkaline qualities are completely neutralized.

Economy of Fuel.—We have examined with interest a small work detailing "*Experiments to determine the comparative quantity of heat evolved in the combustion of the principal varieties of wood and coal used in the United States for fuel; and also to determine the comparative quantity of heat lost by the ordinary apparatus made use of for their combustion*—By Marcus Bull."

The experiments seem to have been made with great care and accuracy, and the results afford matter of interest to every householder.

Mr. Bull has computed the cost of fuel consumed in Philadelphia, in a given year, to be $80,043, which, being divided among the population, gives $7 04 as the average cost of fuel to each inhabitant, supposing the consumption to be equal. Adopting this estimate as a fair average for the population within ten miles of tide-water in the Atlantic states, from Maine to Georgia, it gives an average of twenty-one millions of dollars as the annual cost of fuel for this portion of population, which is assumed to amount to three millions of souls. Estimating the cost of fuel to the remaining eight millions and a half of our population at half the above price, or $3 50 to each individual, he gives us an aggregate of about fifty-one millions of dollars as the total annual expense of fuel, for every purpose, in the United States.

The economy of fuel is to be studied; 1. In the

kind to be selected for use; 2. In its quality and preparation for use; and, 3. In the choice of the apparatus in which it is to be used.

In regard to wood.—The quantity of heat evolved by a cubic foot of the several kinds, when in a perfectly dry state, is very nearly in the ratio of their specific gravity or relative weight; as, for example, the specific gravity of shell-bark hickory being 1.000, a cord weighs 4469 lbs.; by the same scale, the specific gravity of white pine is .476, and the cord weighs only 1868 lbs. The quantity of heat evolved by a pound of white pine is as great as that evolved by a pound of hickory. The difference in value arises from the great disparity in weight—the hickory weighing as 22, and the pine as 9, and their relative value being hickory 100, white pine 42—or the first being considerably more than twice as valuable as the latter. The table which we shall append will exhibit the relative value of the different kinds of fuel in common use.

Charcoal forms a considerable item of fuel; and the facts which Mr. Bull has given us upon this subject will be found to be new and interesting. The value of charcoal, like that of wood, is principally to be determined by its weight; a pound from one kind of wood affording about as much heat as a pound from another kind. The quantity, or, rather, weight of charcoal afforded by the different kinds of wood, is nearly in proportion to the relative weight of the wood. Thus hickory produces 26.22, the specific gravity of the dry coal being .625; while the white pine produces 24.35, and the specific gravity of the dry coal being only .298. Thus, whether burned in the form of wood or of charcoal, a cord of hickory affords more than twice the heat that is found in a cord of white pine. The value of charcoal, however, depends much upon the manner in which it is prepared. The more completely the atmospheric air is excluded from the wood while

under the process of being charred, and the more heat that is given to it, the *heavier*, the *harder*, and the *better* will be the product. The best charcoal will be found of a slate colour on its surface, dense, sonorous, and brittle; while inferior qualities approach to a jet black, and are soft and powdery upon the exterior. To obtain the best quality, Mr. Bull recommends that the wood be piled in a single tier, that charcoal dust be interposed between the wood, that the pile be covered with clay, and then a layer of sand, to close the cracks which the fire may cause in the clay, and that the fire be communicated at the exterior base, and in the centre, and from the top. An intelligent collier, who partially adopted Mr. Bull's recommendation, gained by it 10 per cent. in quantity by measure; and Mr. B. found the coal nearly 20 per cent. heavier than usual. If these facts are correct, and we have no reason to doubt them, it would be an excellent police regulation in our towns to have charcoal sold by the weight instead of measure, and would ultimately be beneficial to the seller as well as to the buyer.

The loss in weight which wood undergoes in drying, and the moisture which it absorbs, by exposure, after it has become dry, are matters of considerable interest to the farmer and the consumer. Hickory wood cut green, and made absolutely dry, experienced a diminution in its weight of 37 1-2 per cent., while oak lost 41 per cent., and soft maple 48 per cent., or very near one half. Both wood and charcoal, after being made perfectly dry, absorbed in twelve months, under cover, from 8 to twelve per cent. of moisture.

If we assume, says Mr. B., the mean quantity of moisture in the woods, when green, at 42 per cent., the great disadvantage of attempting to burn wood in this state [or to transport it to a distance] must be obvious; as in every 100 pounds of this compound of wood and water 42 pounds of aqueous matter

must be expelled from the wood [or transported with it]; and, as the capacity of water for absorbing heat is as 4 to 1 when compared with air, and probably greater during its conversion into vapour, which must be effected before it can escape, the loss of heat must, consequently, be great.

GENERAL TABLE.

COMMON NAMES OF WOODS AND COALS.	Specific gravity of dry wood.	Avoirdupois lbs. of dry wood in a cord.	Product of charcoal from 100 parts of dry wood by weight.	Specific gravities of dry coal.	Pounds of dry coal in one bushel.	Pounds of charcoal from one cord dry wood.	Bushels of charcoal from one cord dry wood.	Time 10° of heat were maintained in the room by the combustion of one lb. of each article.		Value of specified quantities of each article, compared with shell-bark hickory as the standard.
								H.	M.	Cords.
White Ash	.772	3450	25.74	.547	28.78	888	31	6	40	77
White Beach	.724	3236	19.62	.518	27.26	635	23	6		65
Black Birch	.697	3115	19.40	.428	22.52	604	27	6		63
Chestnut	.522	2333	25.29	.379	19.94	590	30	6	40	52
White Elm	.580	2592	24.85	.357	18.79	644	34	6	40	58
Shell-bark Hickory	1000	4469	26.22	.625	32.89	1172	36	6	40	100
Pig-nut Hickory	.949	4241	25.22	.637	33.52	1070	32	6	40	95
Red-heart Hickory	.829	3705	22.90	.509	26.78	848	32	6	30	81
Horn Beam (Iron Wood)	.720	3218	19.	.455	23.94	611	25	6		65
Hard Maple	.644	2878	21.43	.431	22.68	617	27	6	10	60
Soft Maple	.597	2668	20.64	.370	19.47	551	28	6		54
White Oak	.855	3821	21.62	.401	21.10	826	39	6	20	81
Shell-bark White Oak	.775	3464	21.50	.437	22.99	745	32	6	20	74
Pin Oak	.747	3339	22.22	.436	22.94	742	32	6	20	71
Red Oak	.728	3254	22.43	.400	21.05	630	30	6	20	69
Rock Chestnut Oak	.678	3030	20.86	.436	22.94	632	28	6		61
Pitch Pine	.426	1904	26.76	.298	15.68	510	33	6	40	43
White Pine	.418	1868	24.35	.293	15.42	455	30	6	40	42
Lombardy Poplar	.397	1774	25.	.245	12.89	444	34	6	40	40

The above is merely an abstract of Mr. Bull's table, comprising merely the woods in most common use among us. The last column exhibits the relative value of a cord, according to the heat which each affords. Thus, if hickory is worth one dollar, pig-nut hickory is worth 95 cents, hard maple 60 cents, white oak 81 cents, white pine 42 cents, pitch pine 43 cents, &c.

We will now exhibit, in tabular form, the relative value of coals, by the same standard, merely remarking, that a tun of anthracite coal is considered about equal to a cord of shag-bark hickory.

COALS.	Specific gravity of dry coal.	Pounds of dry coal in one bushel.	Time 10 deg. of heat were maintained in the room by the combustion of one lb. of each article.		Value of specified quantities of each article compared with shell-bark hickory as the standard.
			H.	M.	Tuns.
Lehigh	1.494	78.61	13	10	99
Lackawana . . .	1.400	73.67	13	10	99
Rhode Island . .	1.438	75.67	9	30	71
Schuylkill . . .	1.453	76.46	13	40	103
Susquehanna . .	1.373	72.25	13	10	99
Worcester . . .	2.104	110.71	7	50	59
					100 bushels
Liverpool . . .	1.240	65.25	10	30	230
Richmond . . .	1.246	65.56	9	20	205
Hickory charcoal . .	.625	32.89	15		166
Maple do . .	.431	22.68	15		114
Oak do . .	.401	21.10	15		106
Pine do . .	.285	15.	15		75
Coke	.557	29.31	12	50	126

Economy of burning.—Mr. Bull's experiments were made in a sheet-iron stove, with 42 feet of two-inch pipe, having about twenty elbows. A thermometer placed at the mouth of this pipe indicated the same temperature as another hung against the wall of the room, which showed that all the heat given off by the combustion of the fuel was retained in the room. On the supposition that 100 lbs. of

fuel, consumed in this stove, would maintain a temperature of 60 degrees for 12 hours, he found that, to maintain the like temperature for the same time by other apparatus, the fuel must be increased as follows:

In the experiment stove it required .	lbs. 100
In the sheet-iron cylinder stove, the interior surface coated with clay lute, with 9 elbow joints and 13 1-2 feet of two-inch pipe .	105
In a like stove and pipe, with 3 elbow joints	122
In a like stove, and similar pipe and joints, but the pipe placed more vertical than the preceding	128
In a like stove, with 5 feet of pipe and one elbow	149
In a like stove, without clay lute, one elbow, and five feet of four-inch pipe . .	222
In an open Franklin, with one elbow, and five feet of six-inch pipe	270
In an open ordinary parlour grate . .	555
In an open chimney fireplace . . .	1000

It would seem, from these experiments, that nine tenths of the heat given off by fuel burned in an ordinary fireplace, are carried off in the draught, without benefiting the room; that nearly one half is wasted when the fuel is consumed in an open parlour grate; and that lining a stove with firebrick or clay lute produces a great economy in fuel.

These experiments afford important suggestions to the housekeeper. Assuming as data that four cords of dry shell-bark hickory, burned in a sheet-iron cylinder stove, with five feet of pipe and one elbow, will warm an ordinary room during the winter months, it will require, to keep up the like temperature in a similar stove, the following quantities of other materials:

Hickory, as stated . . .	4 cords.
White oak	4 3-4 "
Hard maple	6 2-3 "

Soft maple	7 1-5 cords.
Pitch pine	9 1-7 "
White pine	9 1-5 "
Anthracite coal . . .	4 tuns.

CHAPTER XVII.

Extract from an Address to the Patrons of the Genesee Farmer.

That an improved state of farming has, within a few years, been introduced into this country; that the cultivation of the soil is beginning to be treated on more rational and scientific principles; that the slavish adherence to the maxims and methods of Europe, which have so long obtained among us, are being discarded in favour of systems more adapted to our soils and our climate; that multitudes of wornout and unproductive farms, especially in the eastern counties of the state, have been rescued from that condition and rendered valuable and fruitful, are facts which cannot be denied, and which augur well for our agricultural prosperity. These results are to be mainly attributed to a few things, such as the diffusion of knowledge on farming subjects; the regular and skilful rotation of crops, and the extensive use of plaster in connexion with clover. It is true, much more attention is paid to the preservation and proper use of manure than formerly, and much may justly be granted to this; but manure has always been freely used, while our farms were growing poorer; and had not the rotation of crops, with the use of plaster and clover, been introduced, the deterioration would have continued in spite of all the manure ordinary

farms could have produced. The rotation of crops is founded on the obvious principle that, in drawing their nourishment from the earth, different kinds of food are required by different plants; for instance, that pease or barley do not deprive the earth of the important principle which furnishes the best food for wheat; that some plants derive more of their support from the air and take less from the earth than others; and that no two crops which require the same food should be taken in succession from the same piece of land. To this doctrine there may be a few seeming exceptions; such as plants that require for their perfection little besides heat and a small quantity of moisture, as onions have been grown for half a century on the sandy plains of Weathersfield, and the finest melons in the world on the shifting sands of Egypt. Every one must have noticed, in some sections of this district, a disposition to put in wheat after wheat, and instances have occurred in which such a course has been partially successful; but from the invariableness of the laws of nature, it may be relied on that such farming must be ruinous in the end; and if the abundant materials for wheat in our soils at present should, with such treatment, hold out for years, still an impoverished and nearly ruined country must be left to our successors. Of all plants for the renovation of the soil, none can be considered equal or superior to clover; and it may be deemed a happy dispensation of Providence that those soils best adapted by nature to wheat are also the most congenial to clover, and derive the most essential benefit from plaster.

I have said that more attention is paid to the preparation and application of manure than formerly, but still this is a point on which we are most culpably deficient as farmers. There are soils in every country on which plaster produces little or no effect, and which must speedily, under a course of

cropping, become valueless unless frequently and thoroughly manured; and on all soils manure must be considered a most important and powerful auxiliary. Hitherto, from the extraordinary fertility of our western soils, the necessity of inquiry respecting this branch of farming has not been very urgent; but the experience of every year is rendering the propriety of giving this subject increased attention more and more apparent. In Holland, and in some parts of England, the business of farming is carried to a higher degree of perfection than in any other part of the world, and perhaps the greatest returns are received for the capital and labour employed, and nowhere does the subject of manure receive so much attention as in these very places. In those countries quantities of manure, which in proportion to the farms cultivated would appear utterly incredible were not the facts placed beyond the shadow of a doubt, are produced by the skill and labour of the occupants; and if in the Empire State every rood is to maintain its man, this example must be followed. In Holland, instead of a tun or a tun and a half to the acre, which may be considered about the maximum in New-York, from fifteen to twenty tuns to an acre are considered as not an extraordinary production of manure, and the results from the application of such a mass of compost are such as might rationally be expected.

But though our grand staple is, and probably will be, wheat, still there are many farms where this grain cannot be profitably raised, the owners of which must, of course, look to other articles of produce for a remuneration of their labours, and to these different sources of wealth the public attention should be properly directed. Those lands in the western district which cannot be called wheat-lands are, in general, admirably adapted to grazing, and in raising cattle and horses for market; in enlarged dairies, and in the production of

wool, there seems to be a ready and profitable employment for skill and capital. To carry these branches of farming into effect, care should be taken to provide the best animals, and to commence with the best breeds for the particular purpose aimed at. It is rarely the case that, in cattle, the qualities of size and aptitude for fatting are combined with those of large quantity and richness of milk. Of course, the object intended must be considered in the commencement of stocking a farm, or much time and expense may be thrown away. There are multitudes who are engaged in the dairy business who have never dreamed of testing the quality of the milk given by their different cows, although it is very easily done, and the milk of some cows will, at the same expense of keeping, yield nearly double the quantity of cream to that given by others. Deep slender glasses are used for this purpose where the business is properly attended to, but the usual tall Champagne glasses, or, where these are not to be had, deep common tumblers will answer the purpose. It ought to be remembered, however, that the deeper the column of milk in proportion to its diameter, the more satisfactory will be its test. Fill these glasses, of the same depth, with milk from different cows, and, when they have stood a sufficient time, the thickness of the risen cream can be easily measured on the outside of the glass. By doing this a few times the value of each cow as a dairy cow can be fully known.

In order to breed cattle with success, more attention must be paid to green crops. By green crops I mean common or Norfolk turnips, mangel wurzel, ruta baga, carrots, &c. In no way can so large an amount of food for cattle, horses, hogs, or sheep be drawn from an acre of land as in one of these crops, or one which in every way is so profitable to the raiser of stock. In estimating the value of green crops there is no necessity of taking the extraordi

nary yields, which are sometimes obtained, as a standard. A thousand bushels of ruta baga and eight hundred of carrots have been raised to the acre; but, taking the amount at only one half—and, under almost any ordinary circumstances, that amount can be produced—and it may be seen at once that a crop of corn, oats, or potatoes cannot be compared with the ruta baga or the carrot for profit. The man who wishes to make the most of his farm must raise root crops; for if wheat is his object, he can spare much more of his land for that purpose, and yet keep the necessary stock; and if raising stock is his business, he may depend on seeing his herds and flocks through the winter in much better order, and with less expense, than if he relied on hay alone.

Another source, and I believe an exhaustless mine of wealth, has been too long overlooked by our farmers and our citizens generally. Such is the perfection of machinery and the competition of manufacturers, that most articles of clothing, which formerly were made by female industry at home, are now made at these establishments. The wheel and the loom, as implements of domestic economy, are now rarely seen or heard; and the woollen, the linen, and the cotton, instead of being the production of the fair hands of wives and daughters, owe their existence to power-looms and spinning-jennies, and are purchased at the store as would be an article of foreign importation. This is well enough, if the time formerly spent in these domestic avocations is more profitably employed: on this subject I express no opinion; but can assert, with confidence, that the introduction of the silkworm would be, in most families, not only a source of great profit, but the care and feeding of them an innocent and healthy amusement. The procuring a few mulberry-trees is the first step, and there are few places where these cannot readily be procured; this done,

the rearing and feeding of the worms, and the whole process to the finishing the cocoons for market, is extremely easy and simple. There is not the least reason why millions should be sent from this country every year for an article which might be produced here in perfection, and which only requires the care and labour of females and children for a few weeks in the year.

Farmers are more remarkable for their deference to antiquity than perhaps any other class of practical men. They are content to follow on in the routine of their predecessors, without inquiring whether the course they are pursuing is erroneous, and does not admit of decided improvement. "As our fathers did, so do we," is held a sufficient justification of the most absurd systems of culture. To the agricultural societies which have existed within the state during the last fifteen years, much of the improvement in farming, which has certainly taken place within that time, may fairly be attributed. These societies awakened a spirit of emulation and inquiry; they brought together men of kindred minds, men ardently engaged in the same honourable and peaceful pursuits, and the meetings were places where opinions and facts were freely and beneficially interchanged. Never were the funds of the state more profitably appropriated than in the trifling sums annually distributed from the treasury among these societies; and the day when the voice of the people shall be so far heard as to cause their revivification under the patronage of the state, may be hailed as a proud one for the resources and spirit of New-York. It is not to the comparatively paltry sum divided that we look for the benefit, but to the spirit of inquiry it will create, and the public attention that will be directed to the interests of agriculture generally.

Next in benefit to agricultural societies, and in a great measure springing from them, is to be placed

the influence of agricultural journals. While their beneficial effects have been almost unlimited, they have injured no one; and now that their utility has been fully tested by experience, that farmer has been guilty of an unpardonable inattention to his true interests who neglects to provide himself with a well-conducted journal of this kind. I am sensible there is a prejudice, an inveterate, but most unfounded and untenable prejudice, against what is termed by some of our cultivators book farming. With such men it is enough to condemn any proposition or discredit any statement that comes from a book or a journal. They reason thus: our fathers for a century have been content with thirty bushels of corn, or ten bushels of wheat to an acre, and why should we undertake to be wiser than they? They never heard of a chymical analysis of soils, of turnip culture, of rotation in crops, and agricultural books, and why should we bother our heads about such matters? With such reasoning thousands resist all improvement, and rest contented in an ignorance not the less prejudicial because so shamefully prevalent. And what is this book farming, about which such unreasonable notions prevail? A few cultivators of the earth agree to communicate to each other the results of their experience in farming; raising cattle, sheep, and hogs; the best modes of preparing and using manure; the most profitable crops, and the best modes of raising them; the best breeds, and the best modes of fattening animals; and, in short, all things of general interest relating to the occupation of a farmer. These results are committed to writing, go through the press, and become a book. He who chooses to follow the results of enlightened experience as there detailed, is guilty of book farming. A gentleman who has money, inclination, and leisure, following nature as a guide, commences a series of agricultural experiments, which result in doubling the means of existence

from a given quantity of land, or, in other words, makes two blades of grass, or two bushels of wheat, grow where but one grew before. Such a man is a benefactor to his country; but if, actuated by a noble regard for the general good, and anxious that all should partake with him in the benefit, he sends a history of his proceedings to a journal, that others may avoid his errors, it is denounced as a mere whim, as nothing but book farming. No matter how important or how valuable the published accounts may be, if they add one half to the productiveness of a farm, there are many, too many, who scout them as unworthy of notice. If, however, we were required to point out the men who had done the most to advance the agricultural interests of the state or country, who have introduced the most successful methods of raising crops and improving the soil, we should be obliged to fix on those who are emphatically book farmers; men who were bred to other pursuits, but have relinquished them for the safe, honourable, and, in their case, eminently successful cultivation of the soil. It is to such men as Powell, Colman, Buel, Bradley, and the lamented Thomas, that the farmer who wishes to adopt the easiest and most profitable course of farming must look as guides, and these are the most thorough book farmers in the country. It is time that this unworthy prejudice against that knowledge of farming which may be derived from books was done away; that farmers should not deem themselves so far advanced towards perfection in their pursuits as to be beyond the teachings of recorded experience. We know there are visionaries in agriculture as well as in everything else; men who are mere theorists; who from their studies put forth their vague notions and crude ideas as facts, without submitting them to the ordeal of experiment, the test of time. But the practical, well-informed farmer, and such all should be, is not deceived by such fantasies;

from the premises laid down, and comparing them with his own experience, he perceives the absurdities to which they lead, and rejects them without hesitation. But the theoretical farmer, who with time, and money, and nature for his guide, submits his ideas to the test of experiment, may obtain results astonishing to himself, and which, when laid before the public, demand its lasting gratitude. To books, then, we must continue to look for practical instruction in the most approved modes of agriculture. A journal is a reservoir in which is accumulated the experience of ages and the practice of thousands; and to it the young farmer may profitably go for information on a multitude of topics respecting which the inexperienced and uninformed must necessarily be ignorant. To all, then, who aspire to the honourable title of an intelligent tiller of the soil, we say, take some standard agricultural work; to every present subscriber to the Farmer we say, not only continue your subscription, and endeavour to promote its circulation among your neighbours, but become a contributor to its columns of the results of your farming experience, your success, and your failures; preserve the numbers carefully, and see, when each volume closes, that they are well bound; read carefully, compare thoroughly, reduce your knowledge to practice, and you will be singularly unfortunate indeed if you do not find yourself remunerated tenfold.—*W. Gaylord.*

MAXIMS OF WASHINGTON.

Among those written in his own hand, is a series of maxims under the head of "*Rules of civility and decent behaviour in company and conversation.*" Of these there are 110. The only specimens published we extract, and agree with Mr. Sparks in the opinion that, "whoever has studied the character of Washington, will be persuaded that some of its most prominent features took their shape from the rules thus early selected and adopted as his guide."

1. Every action in company ought to be with some sign of respect to those present.

2. In the presence of others, sing not to yourself with a humming noise, nor drum with your fingers or feet.

3. Sleep not when others speak, sit not when others stand, speak not when you should hold your peace, and walk not when others stop.

4. Turn not your back to others, especially in speaking; jog not the table or desk on which another reads or writes; lean not on any one.

5. Be no flatterer, neither play with any one that delights not to be played with.

6. Read no letters, books, or papers in company, but when there is a necessity for doing it you must ask leave. Come not near the books or writings of any one so as to read them unasked. Also, look not nigh when another is writing a letter.

7. Let your countenance be pleasant, but in serious matters somewhat grave.

8. Show not yourself glad at the misfortunes of another, though he were your enemy.

9. When you meet with one of greater quality than yourself, stop and retire, especially if it be to

a door, or any straight place, to give way for him to pass.

10. They that are in dignity or office have, in all places, precedence; but while they are young they ought to respect those that are their equals in birth or other qualities, though they have no public charge.

11. It is good manners to prefer them to whom we speak before ourselves, especially if they be above us, with whom, in no sort, we ought not to begin.

12. Let your discourse with men of business be short and comprehensive.

13. In visiting the sick, do not presently play the physician, if you be not knowing therein.

14. In writing or speaking, give to every person his due title, according to his degree and the custom of the place.

15. Strive not with your superiors in argument, but always submit your judgment to others with modesty.

16. Undertake not to teach your equal in the art himself professes; it savours of arrogance.

17. When a man does all he can, though it succeeds not well, blame not him that did it.

18. Being to advise or reprehend any one, consider whether it ought to be in public or in private, presently or at some other time; also, in what terms to do it; and, in reproving, show no signs of choler, but do it with sweetness and mildness.

19. Take all admonitions thankfully, in whatsoever given; but, afterward, not being culpable, take a time or place convenient to let him know it that gave them.

20. Mock not nor jest at anything of importance; break no jests that are sharp biting, and if you deliver anything witty and pleasant, abstain from laughing thereat yourself.

21. Wherein you reprove another, be unblameable

yourself, for example is more prevalent than precept.

22. Use no reproachful language against any one, neither curses nor revilings.

23. Be not hasty to believe flying reports to the disparagement of any one.

24. In your apparel be modest, and endeavour to accommodate nature rather than procure admiration. Keep to the fashion of your equals, such as are civil and orderly with respect to time and place.

25. Play not the peacock, looking everywhere about you to see if you be well decked, if your shoes fit well, and your stockings set neatly, and clothes handsomely.

26. Associate yourself with men of good quality if you esteem your own reputation, for it is better to be alone than in bad company.

27. Let your conversation be without malice or envy, for it is a sign of a tractable and commendable nature, and in all cases of passion admit reason to govern.

28. Be not immodest in urging your friend to discover a secret.

29. Utter not base and frivolous things among grown and learned men ; nor very difficult questions or subjects among the ignorant, nor things hard to be believed.

30. Speak not of doleful things in time of mirth nor at the table ; speak not of melancholy things, as death and wounds, and, if others mention them, change, if you can, the discourse. Tell not your dreams but to your intimate friends.

31. Break not a jest where none can take pleasure in mirth. Laugh not aloud nor at all without occasion. Deride no man's misfortune, though there seem to be some cause.

32. Speak not injurious words, neither in jest nor in earnest. Scoff at none, although they give occasion.

33. Be not froward, but friendly and courteous; the first to salute, hear, and answer, and be not pensive when it is time to converse.

34. Detract not from others, but neither be excessive in commending.

35. Go not thither where you know not whether you shall be welcome or not. Give not advice without being asked, and, when desired to do it, do it briefly.

36. If two contend together, take not the part of either unconstrained, and be not obstinate in your opinion; in things indifferent, be of the major side.

37. Reprehend not the imperfection of others, for that belongs to parents, masters, and superiors.

38. Gaze not on the marks or blemishes of others, and ask not how they came. What you may speak in secret to your friend, deliver not before others.

39. Speak not in an unknown tongue in company, but in your own language, and that as those of quality do, and not as the vulgar. Sublime matters treat seriously.

40. Think before you speak; pronounce not imperfectly, nor bring out your words too hastily, but orderly and distinctly.

41. When another speaks, be attentive yourself and disturb not the audience. If any hesitate in his words, help him not nor prompt him without being desired; interrupt him not, nor answer him until his speech be ended.

42. Treat with men at fit times about business, and whisper not in the company of others.

43. Make no comparisons, and if any of the company be commended for any brave act of virtue, commend not another for the same.

44. Be not apt to relate news if you know not the truth thereof. In discoursing of things you have heard, name your author always. A secret discover not.

45. Be not curious to know the affairs of others, neither approach to those that speak in private.

46. Undertake not what you cannot perform; but be careful to keep your promise.

47. When you deliver a matter, do it without passion and indiscretion, however mean the person may be you do it to.

48. When your superiors talk to anybody, hear them, but neither speak nor laugh.

49. In disputes, be not so desirous to overcome as not to give liberty to each one to deliver his opinion, and to submit the judgment of the major part, especially if they are judges of the dispute.

50. Be not tedious in discourse, make not many digressions, nor repeat often the same matter of discourse.

51. Speak no evil of the absent, for it is unjust.

52. Make no show of taking great delight in your victuals, feed not with greediness, cut your bread with a knife, lean not on the table, neither find fault with what you eat.

53. Be not angry at the table, whatever happens, and, if you have reason to be so, show it not; put on a cheerful countenance, especially if there be strangers, for good-humour makes one dish a feast.

54. Set not yourself at the upper end of the table, but if it be your due, or the master of the house will have it so, contend not, lest you should trouble the company.

55. When you speak of God or his attributes, let it be seriously, in reverence and honour, and obey your natural parents, although they may be poor.

56. Let your recreations be manful, not sinful.

57. Labour to keep alive in your breast that little spark of celestial fire called conscience.

THE END?

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